FIG 1

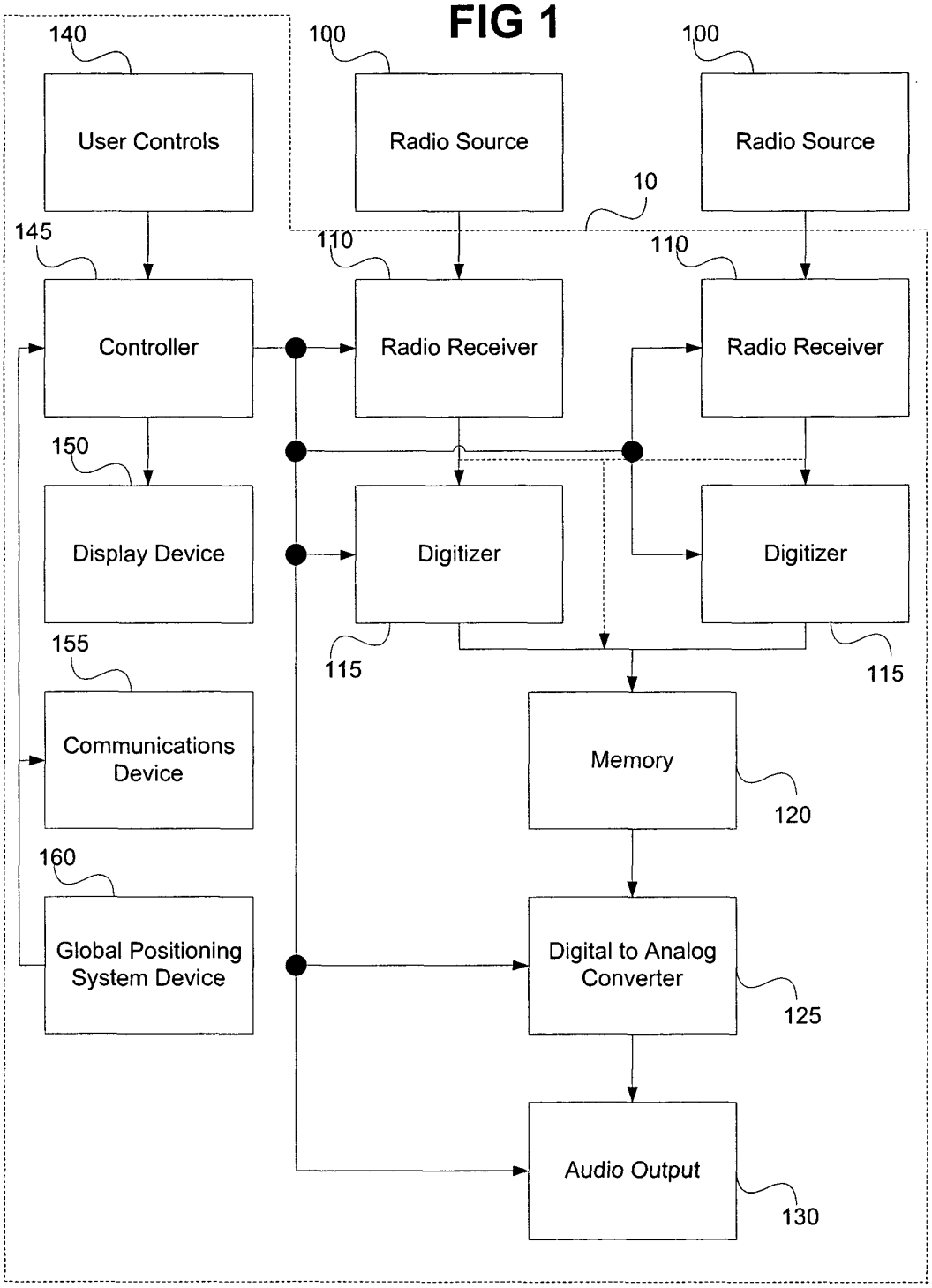

140
User Controls
100
Radio Source
100
Radio Source
10
145
110
110
Controller
Radio Receiver
Radio Receiver
150
Display Device
Digitizer
Digitizer
115
115
155
Communications Device
Memory
120
160
Global Positioning System Device
Digital to Analog Converter
125
Audio Output
130

FIG 2

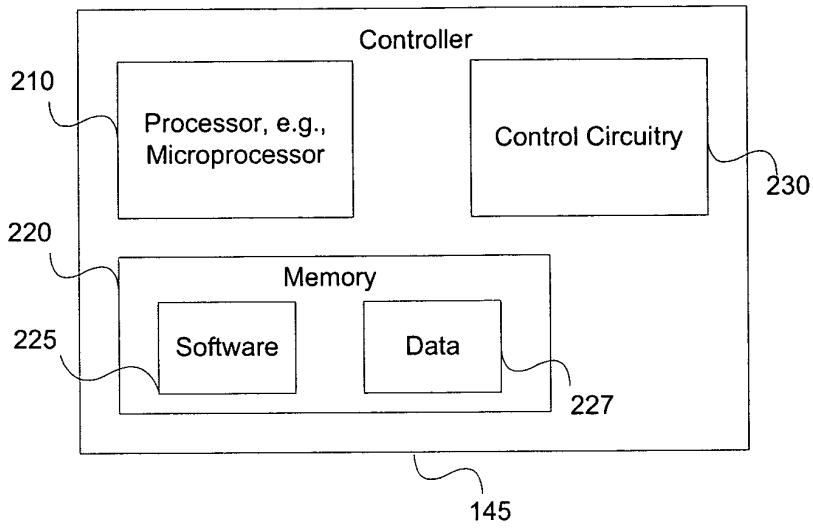

Controller
210
Processor, e.g., Microprocessor
Control Circuitry
230
220
Memory
225
Software
Data
227
145

FIG 3A

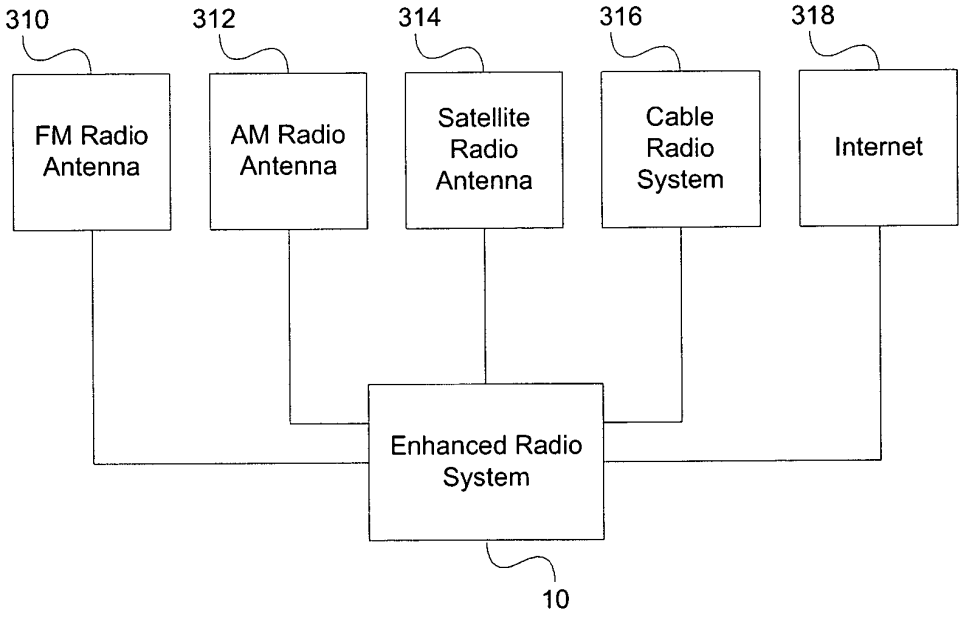
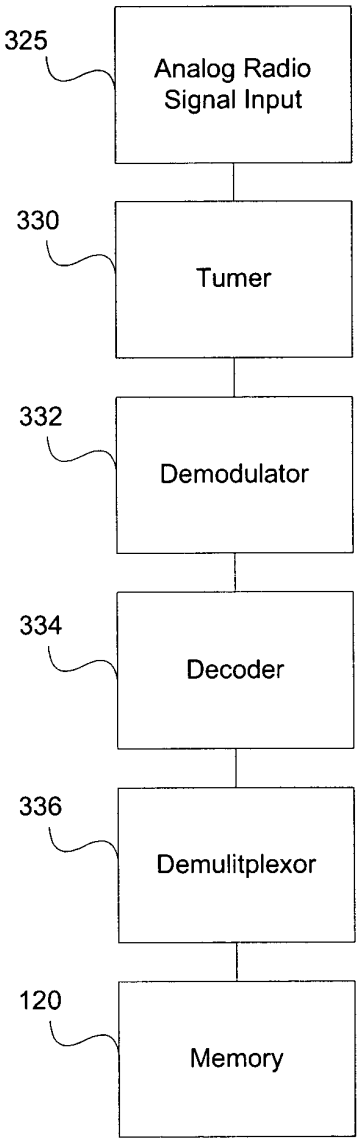
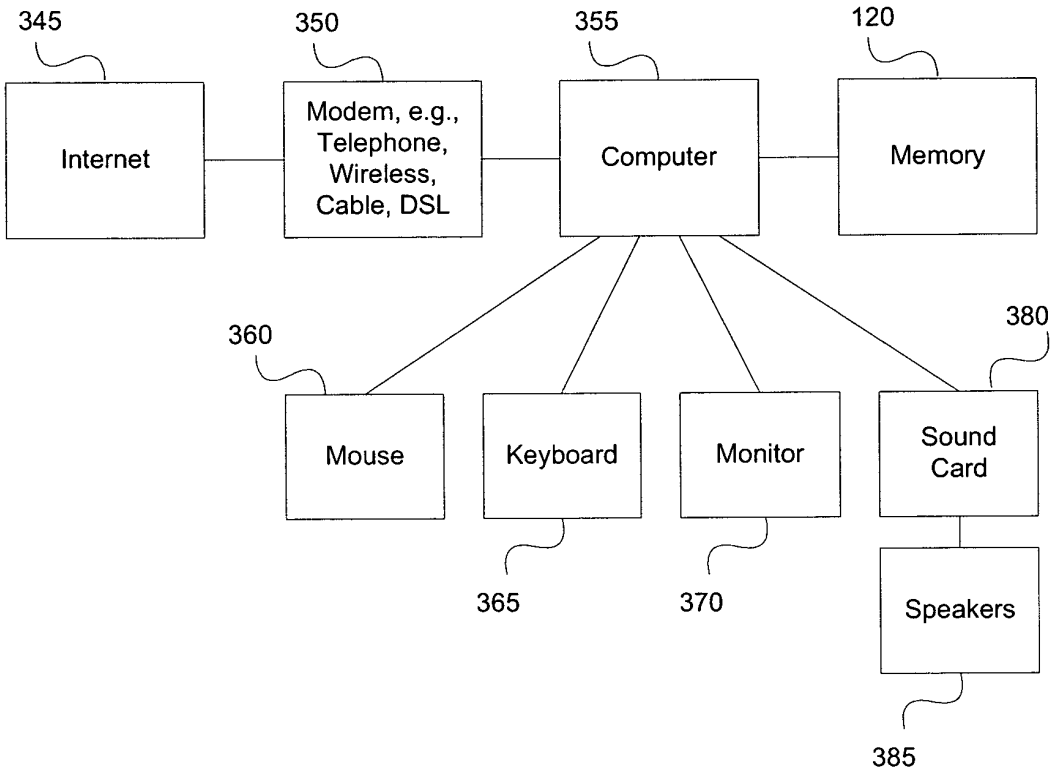

310
312
314
316
318
FM Radio Antenna
AM Radio Antenna
Satellite Radio Antenna
Cable Radio System
Internet
Enhanced Radio System
10

FIG 3B


325
Analog Radio Signal Input
330
Tumer
332
Demodulator
334
Decoder
336
Demulitplexor
120
Memory

320

FIG 3C


345
350
355
120
Internet
Modem, e.g., Telephone, Wireless, Cable, DSL
Computer
Memory
360
380
Mouse
Keyboard
Monitor
Sound Card
365
370
Speakers
385

340

FIG 4

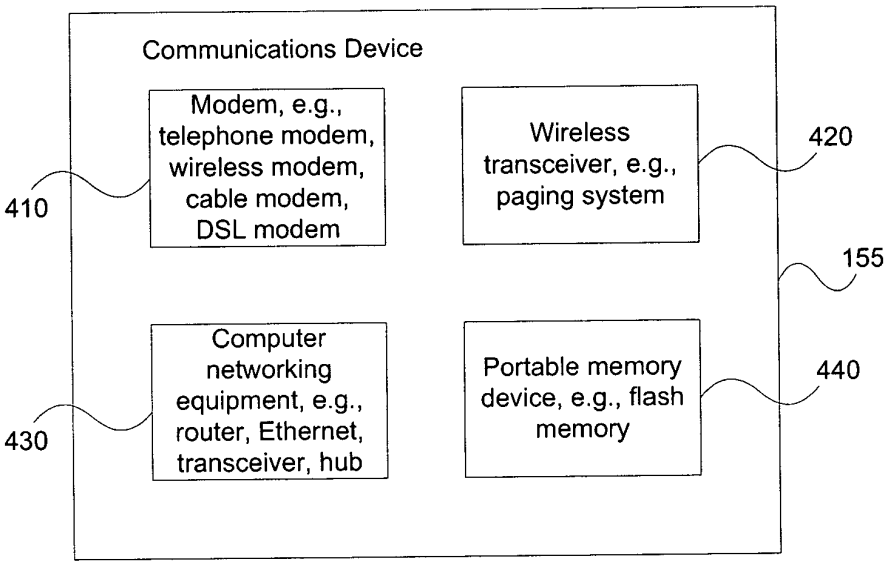
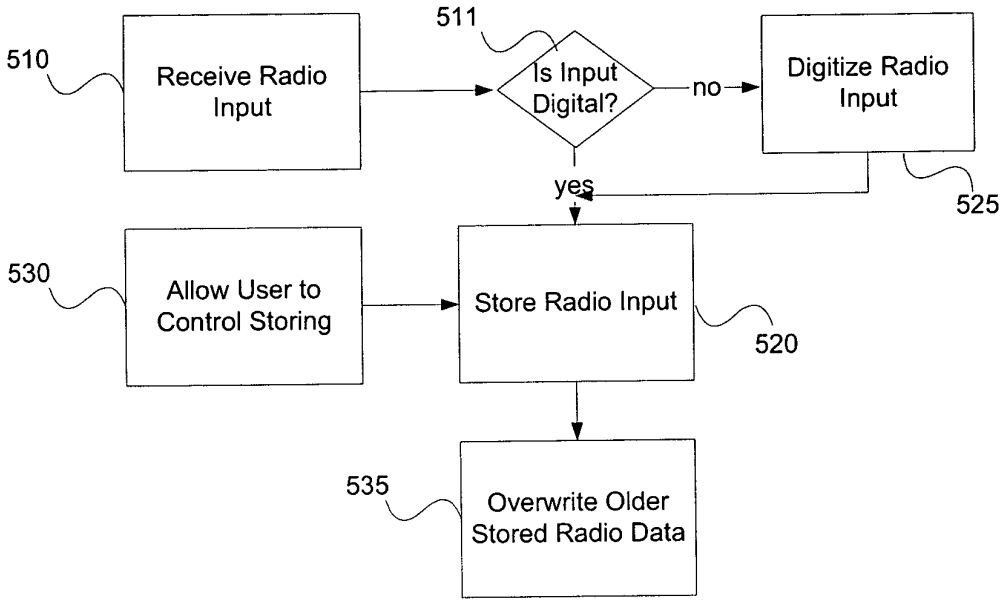
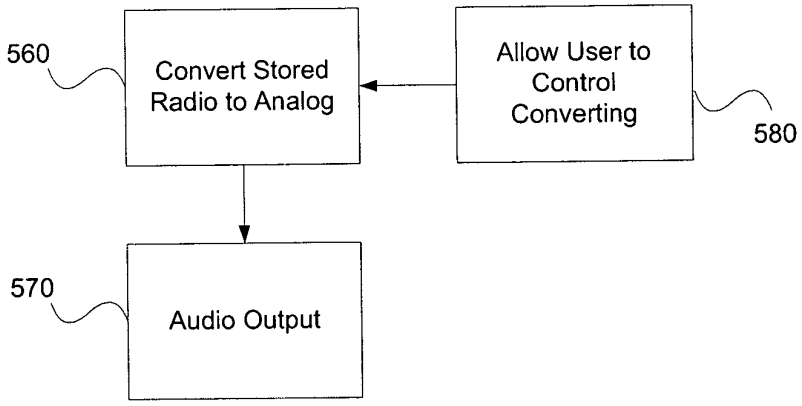

Communications Device
Modem, e.g., telephone modem, wireless modem, cable modem, DSL modem
Wireless transceiver, e.g., paging system
Computer networking equipment, e.g., router, Ethernet, transceiver, hub
Portable memory device, e.g., flash memory
410
420
430
440
155

FIG 5A



500

FIG 5B



550

FIG 6A

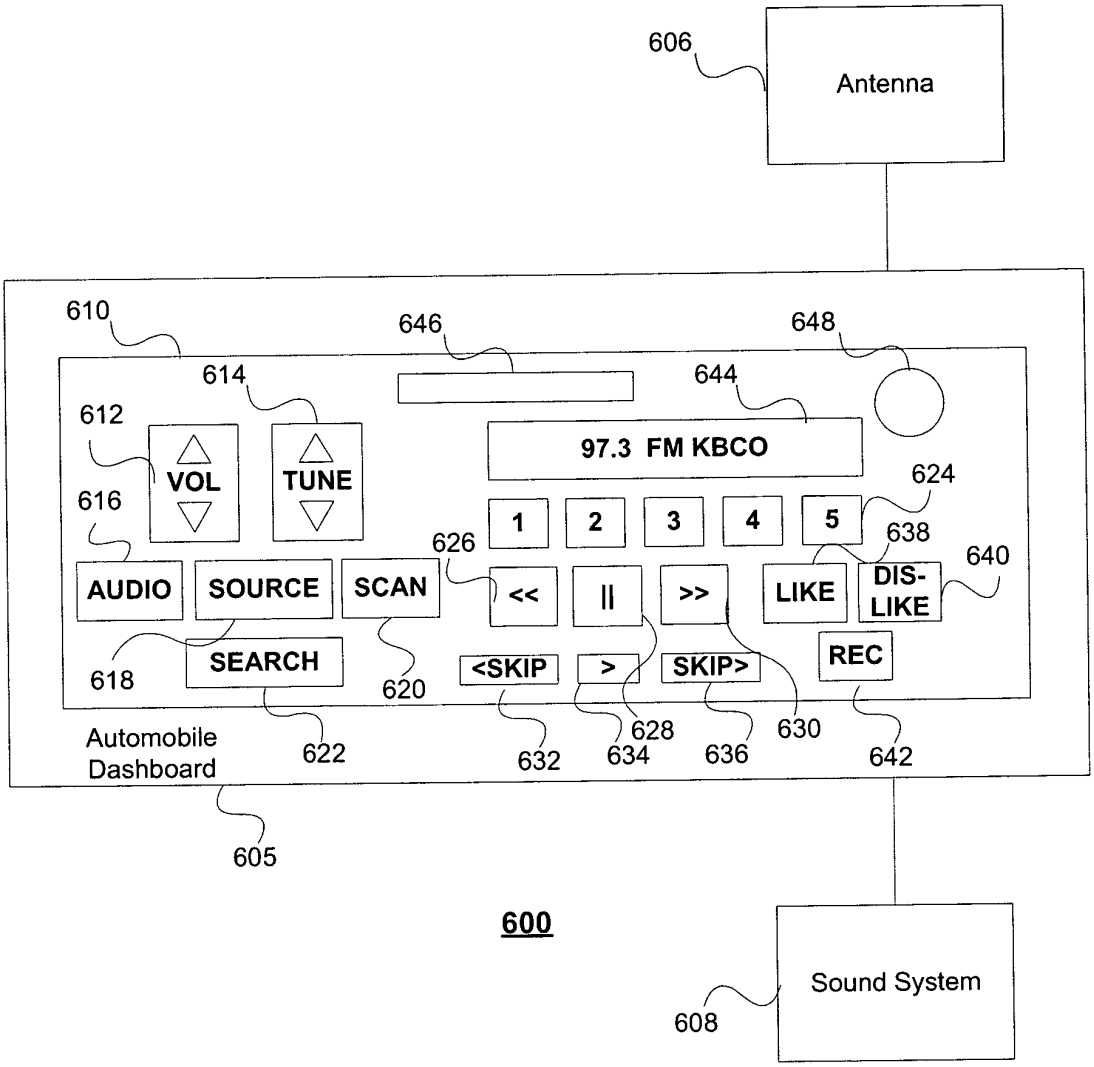
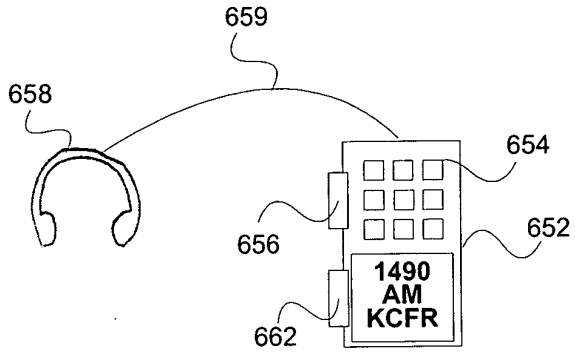
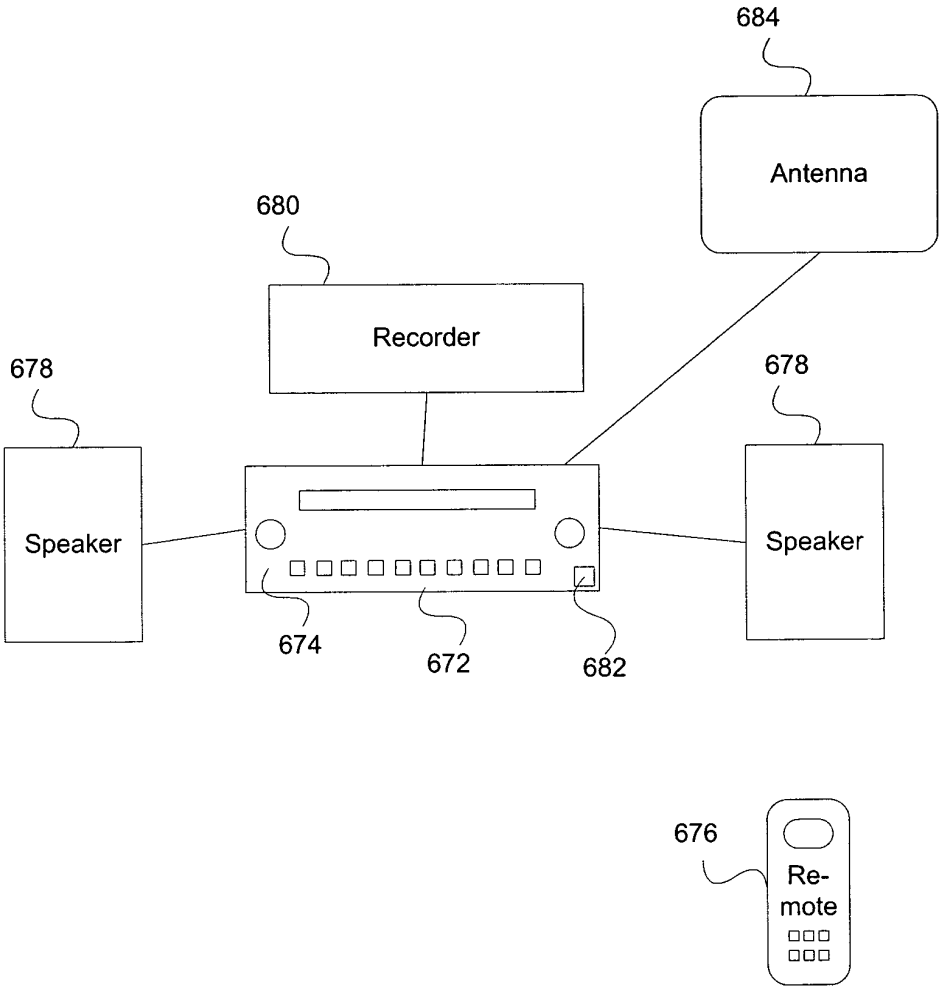

606
Antenna
610
646
648
614
644
612
VOL
TUNE
97.3 FM KBCO
624
616
1
2
3
4
5
638
626
640
AUDIO
SOURCE
SCAN
<<
||
>>
LIKE
DIS-
LIKE
SEARCH
REC
618
620
<SKIP
>
SKIP>
Automobile
Dashboard
622
632
628
634
636
630
642
605
600
Sound System
608

FIG 6B



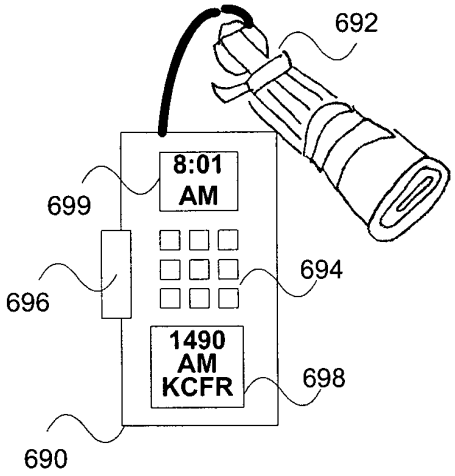
650

FIG 6C


684
Antenna
680
Recorder
678
678
Speaker
Speaker
674
672
682
676
Re-
mote

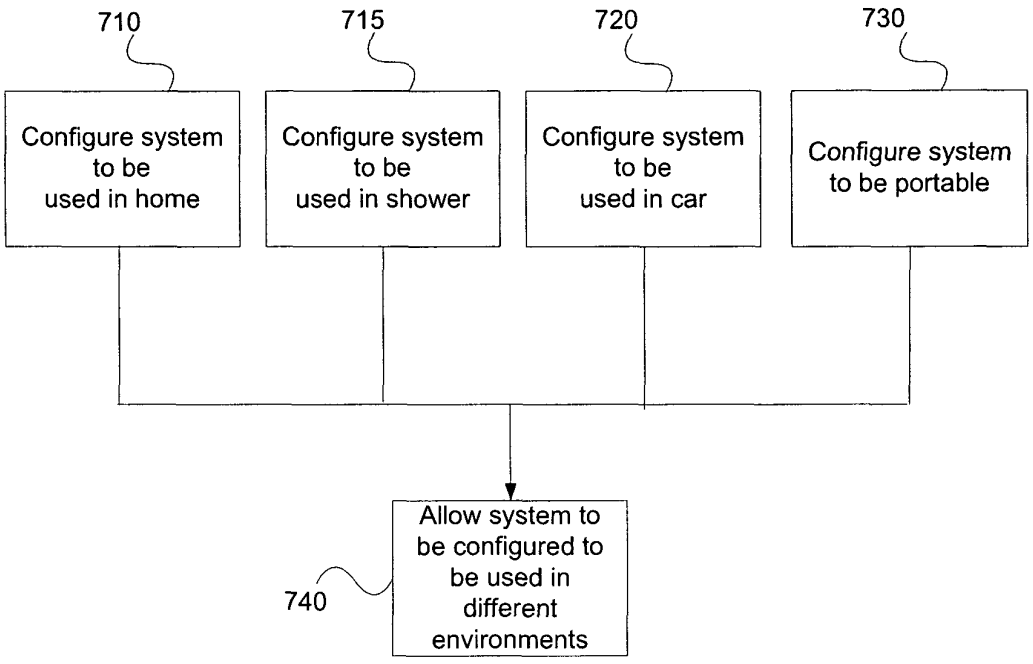
670

FIG 6D



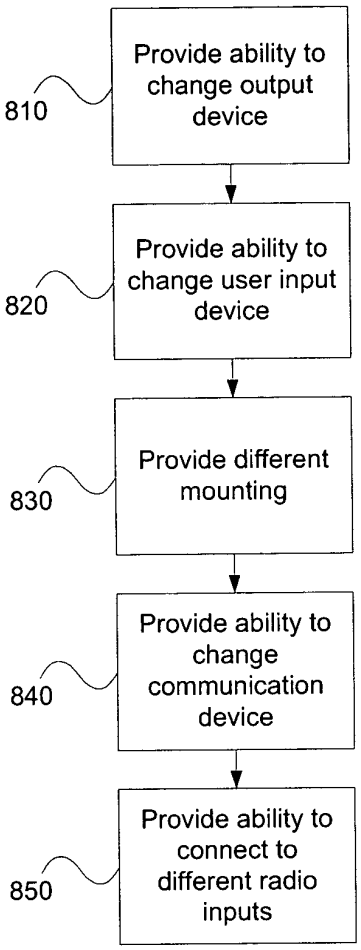
690

FIG 7


710
715
720
730
Configure system to be used in home
Configure system to be used in shower
Configure system to be used in car
Configure system to be portable
740
Allow system to be configured to be used in different environments

700

FIG 8


Provide ability to change output device
810
Provide ability to change user input device
820
Provide different mounting
830
Provide ability to change communication device
840
Provide ability to connect to different radio inputs
850

740

FIG 9

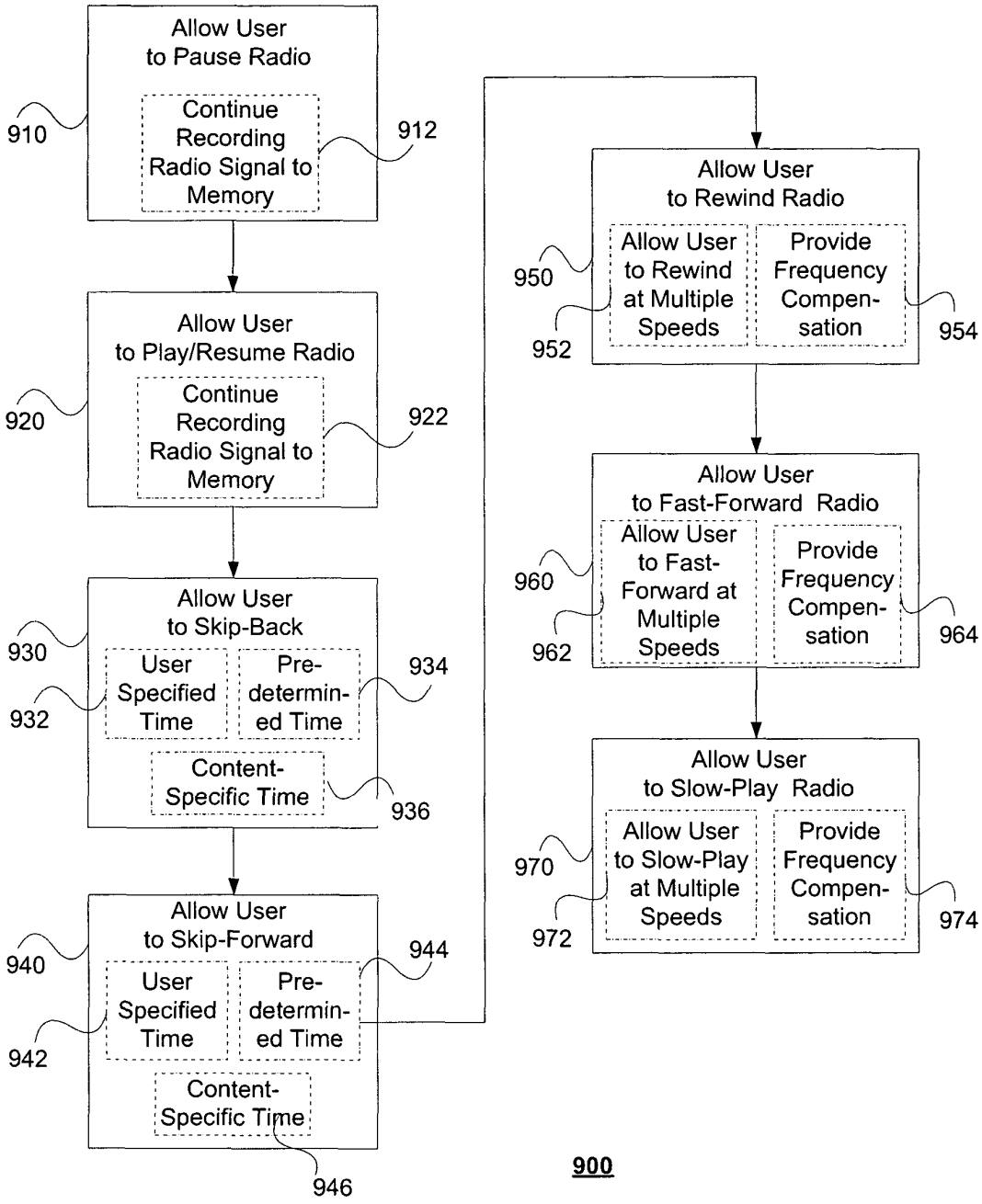
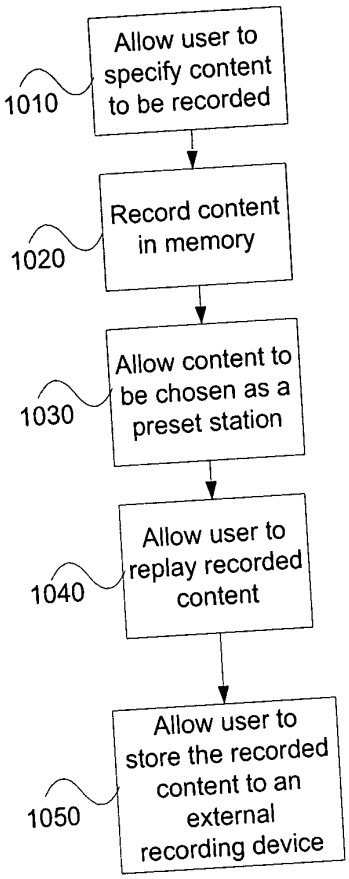
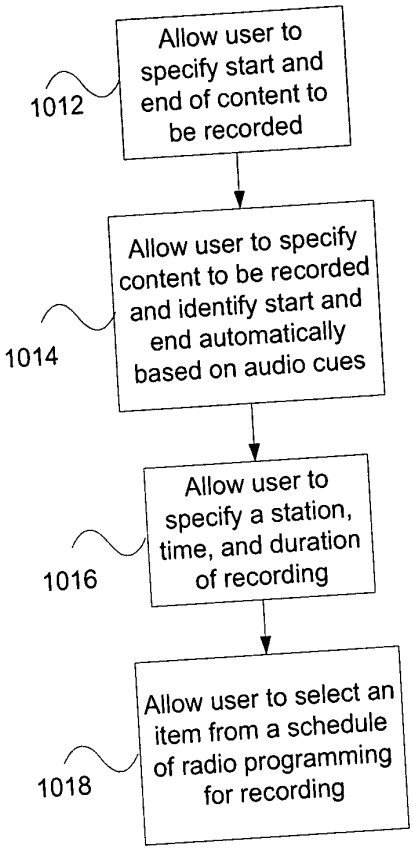

Allow User to Pause Radio
Continue Recording Radio Signal to Memory
910
912
Allow User to Play/Resume Radio
Continue Recording Radio Signal to Memory
920
922
Allow User to Skip-Back
User Specified Time
Pre-determin-ed Time
Content-Specific Time
930
932
934
936
Allow User to Skip-Forward
User Specified Time
Pre-determin-ed Time
Content-Specific Time
940
942
944
946
Allow User to Rewind Radio
Allow User to Rewind at Multiple Speeds
Provide Frequency Compen-sation
950
952
954
Allow User to Fast-Forward Radio
Allow User to Fast-Forward at Multiple Speeds
Provide Frequency Compen-sation
960
962
964
Allow User to Slow-Play Radio
Allow User to Slow-Play at Multiple Speeds
Provide Frequency Compen-sation
970
972
974
900

FIG 10A



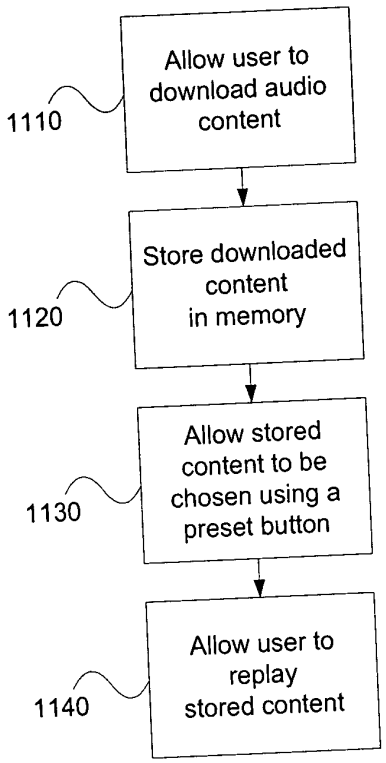
1000

FIG 10B



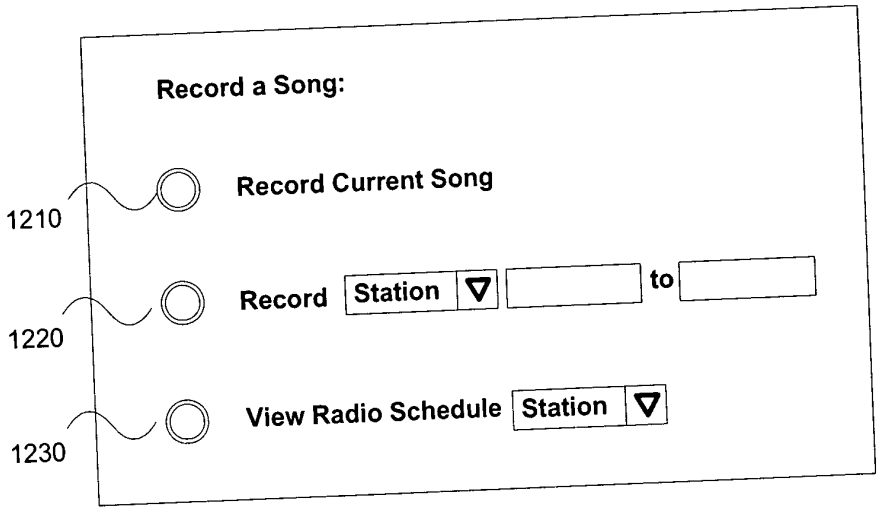
1010

FIG 11


Allow user to download audio content
1110
Store downloaded content in memory
1120
Allow stored content to be chosen using a preset button
1130
Allow user to replay stored content
1140

1100

FIG 12


Record a Song:
Record Current Song
1210
Record
Station
to
1220
View Radio Schedule
Station
1230

1200

FIG 13

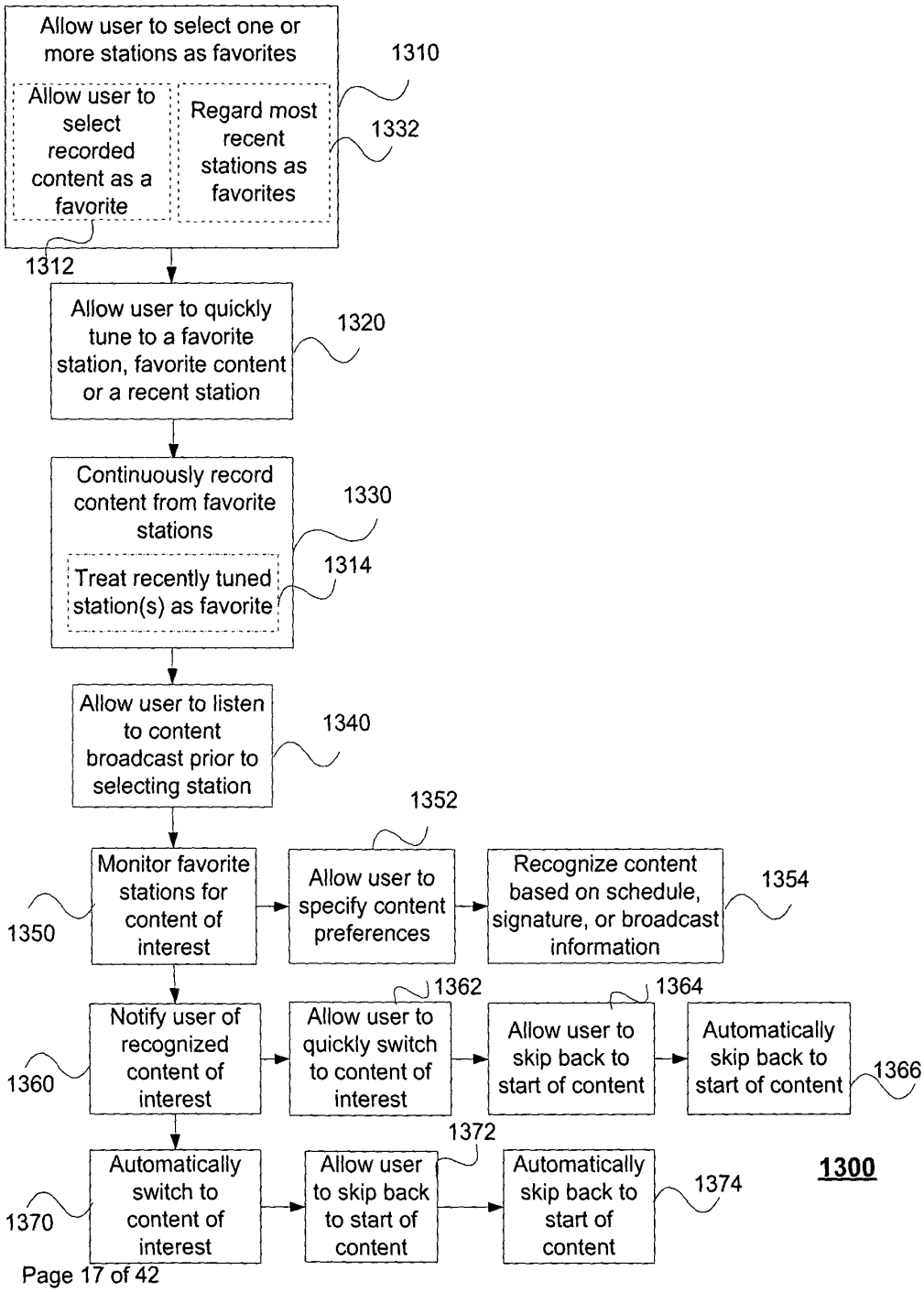

Allow user to select one or more stations as favorites
1310
Allow user to select recorded content as a favorite
Regard most recent stations as favorites
1332
1312
Allow user to quickly tune to a favorite station, favorite content or a recent station
1320
Continuously record content from favorite stations
1330
Treat recently tuned station(s) as favorite
1314
Allow user to listen to content broadcast prior to selecting station
1340
1352
Monitor favorite stations for content of interest
1350
Allow user to specify content preferences
Recognize content based on schedule, signature, or broadcast information
1354
1362
1364
Notify user of recognized content of interest
1360
Allow user to quickly switch to content of interest
Allow user to skip back to start of content
Automatically skip back to start of content
1366
1372
Automatically switch to content of interest
1370
Allow user to skip back to start of content
Automatically skip back to start of content
1374
1300

FIG 14

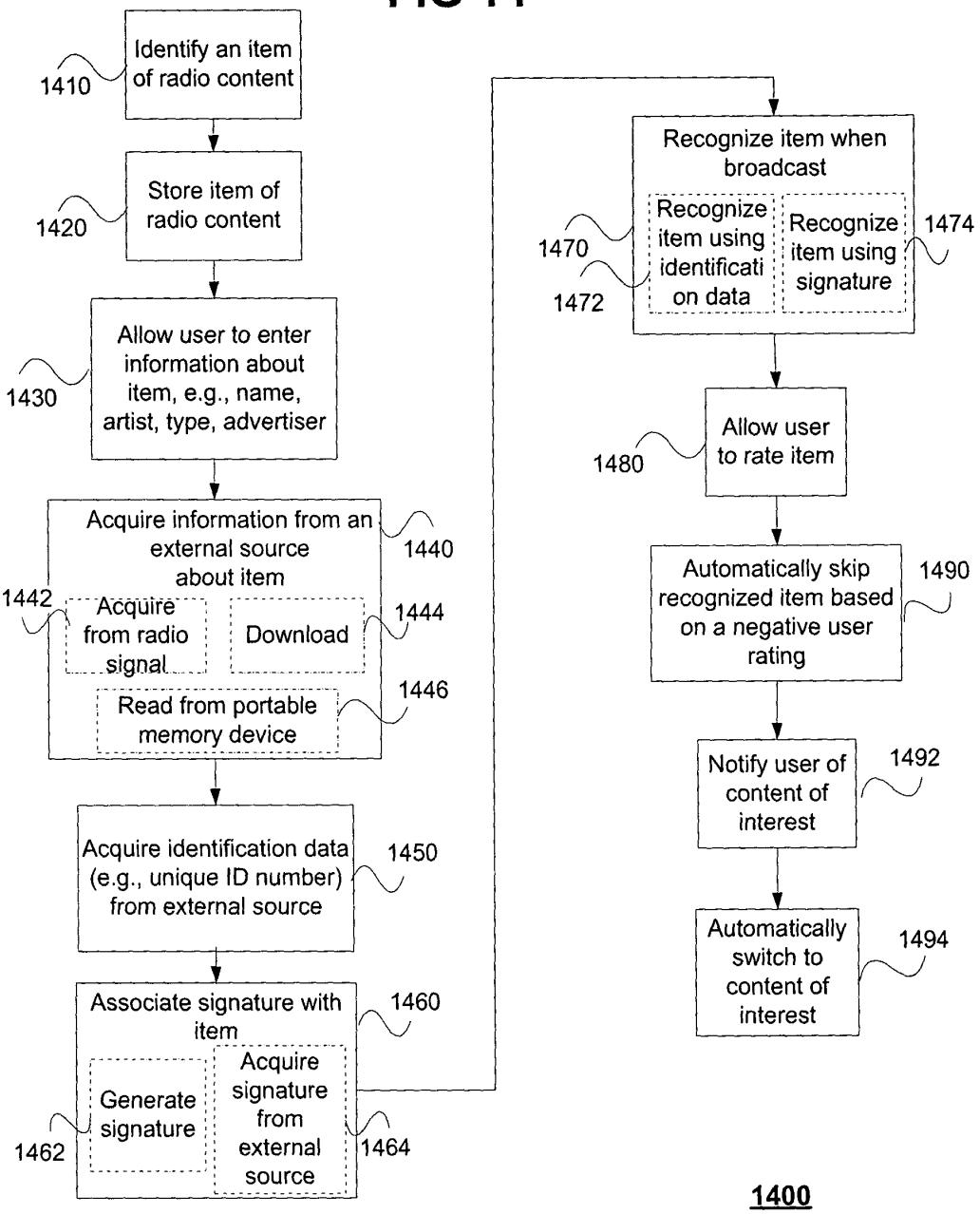
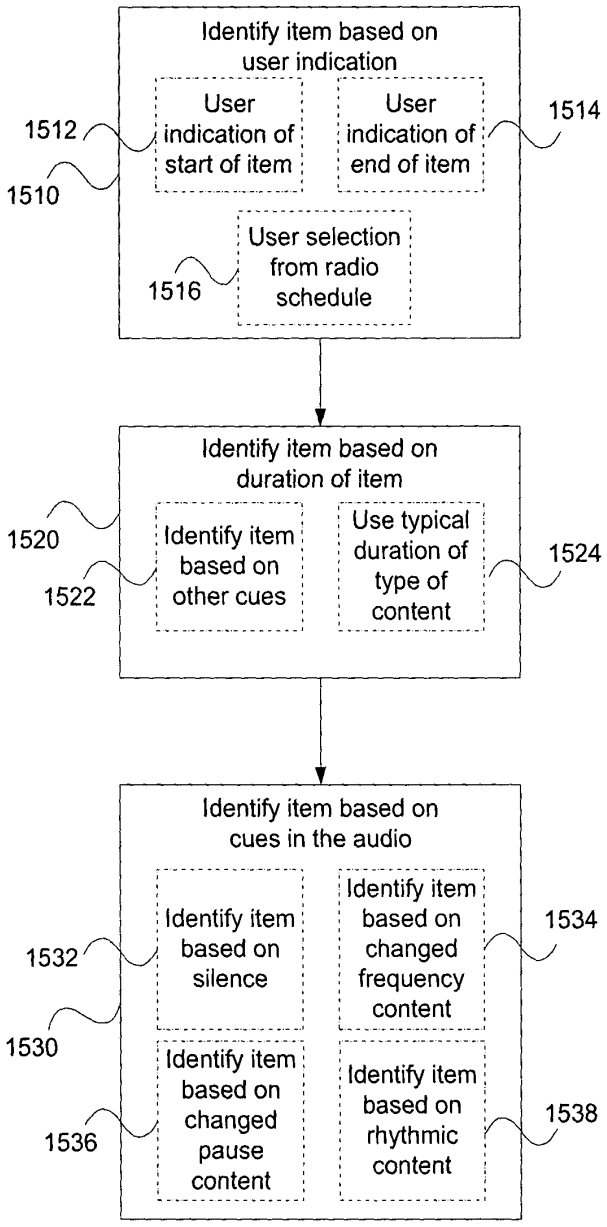

Identify an item of radio content
1410
Store item of radio content
1420
Allow user to enter information about item, e.g., name, artist, type, advertiser
1430
Acquire information from an external source about item
1440
1442
Acquire from radio signal
Download
1444
Read from portable memory device
1446
Acquire identification data (e.g., unique ID number) from external source
1450
Associate signature with item
1460
Generate signature
1462
Acquire signature from external source
1464
Recognize item when broadcast
1470
1472
Recognize item using identificati on data
Recognize item using signature
1474
Allow user to rate item
1480
Automatically skip recognized item based on a negative user rating
1490
Notify user of content of interest
1492
Automatically switch to content of interest
1494
1400

FIG 15


Identify item based on user indication
User indication of start of item
User indication of end of item
User selection from radio schedule
1512
1514
1510
1516
Identify item based on duration of item
Identify item based on other cues
Use typical duration of type of content
1520
1522
1524
Identify item based on cues in the audio
Identify item based on silence
Identify item based on changed frequency content
Identify item based on changed pause content
Identify item based on rhythmic content
1532
1534
1530
1536
1538

1410

FIG 16

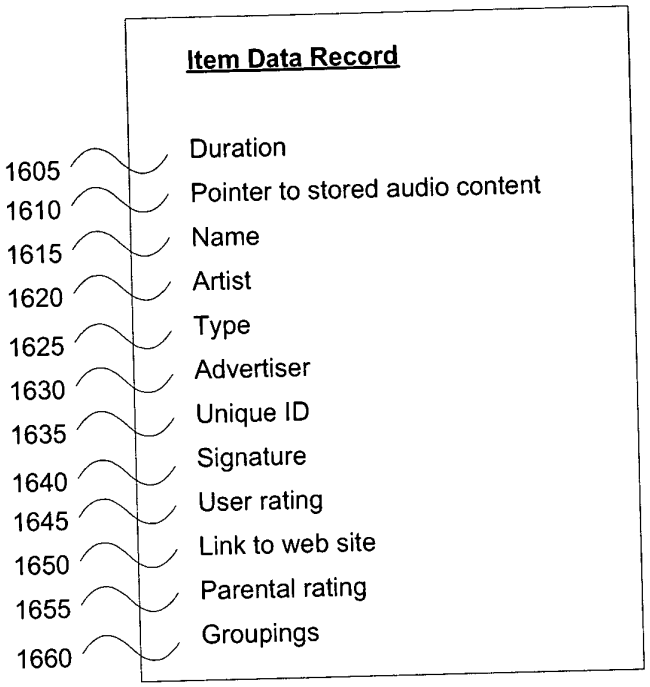
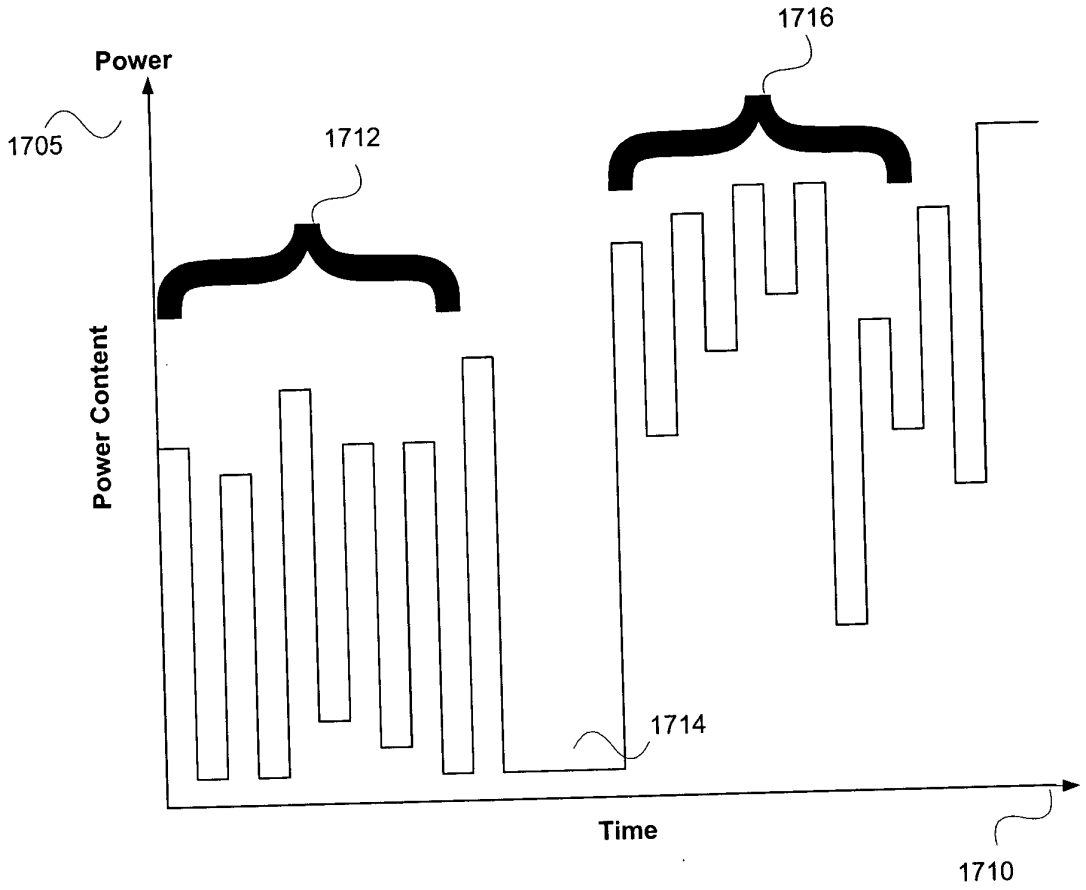
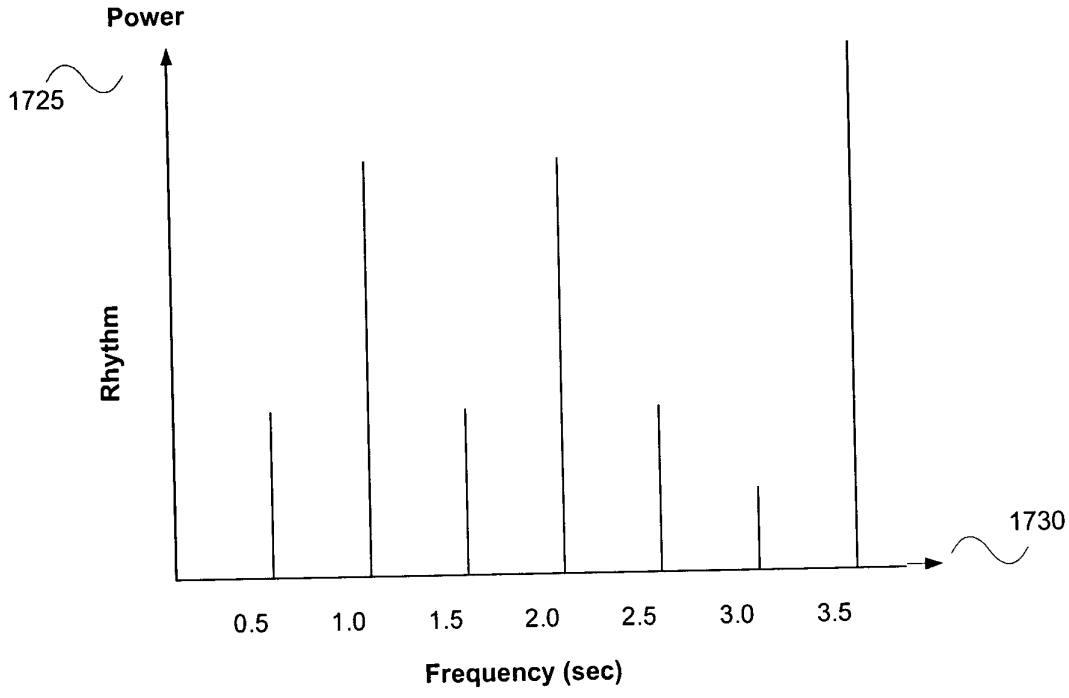

Item Data Record
1605
Duration
1610
Pointer to stored audio content
1615
Name
1620
Artist
1625
Type
1630
Advertiser
1635
Unique ID
1640
Signature
1645
User rating
1650
Link to web site
1655
Parental rating
1660
Groupings
1600

FIG 17A



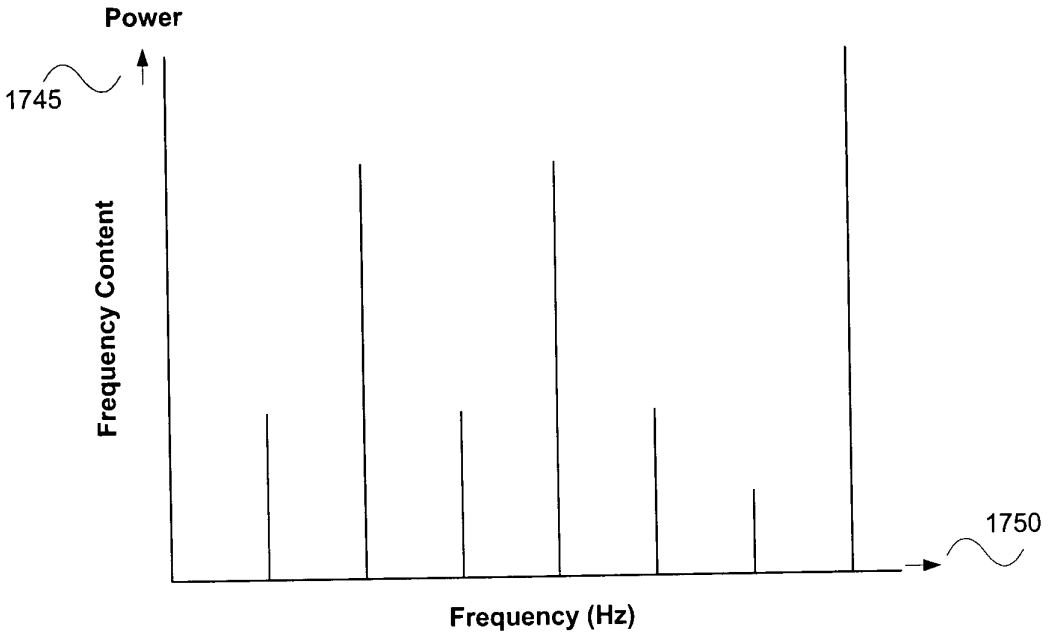
1700

FIG 17B



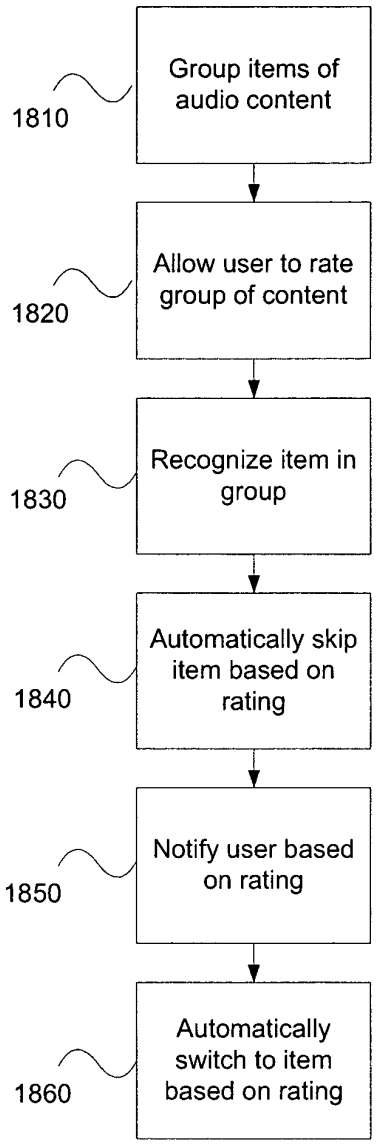
1720

FIG 17C



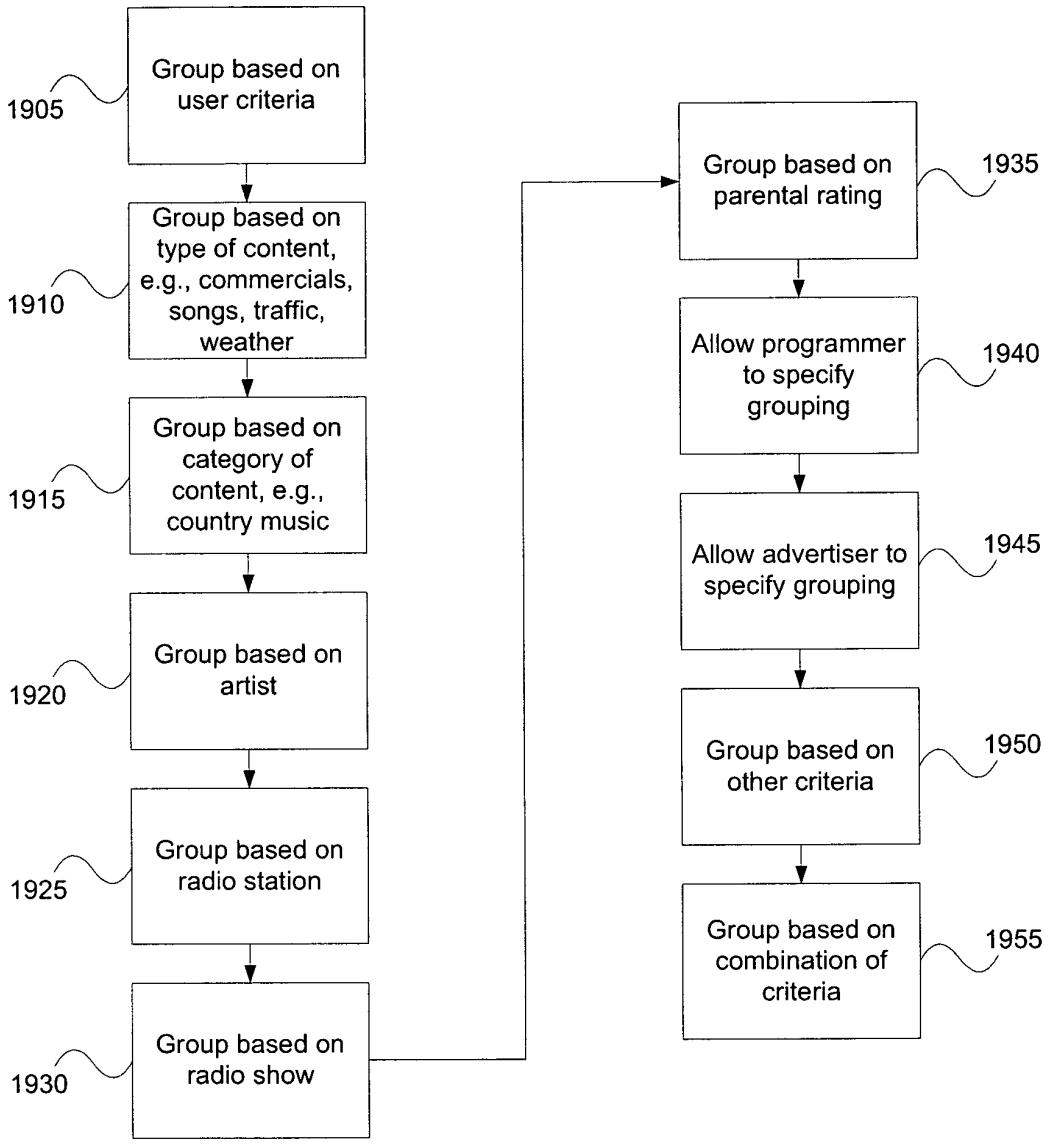
1740

FIG 18


Group items of audio content
1810
Allow user to rate group of content
1820
Recognize item in group
1830
Automatically skip item based on rating
1840
Notify user based on rating
1850
Automatically switch to item based on rating
1860

1800

FIG 19


Group based on user criteria
1905
Group based on type of content, e.g., commercials, songs, traffic, weather
1910
Group based on category of content, e.g., country music
1915
Group based on artist
1920
Group based on radio station
1925
Group based on radio show
1930
Group based on parental rating
1935
Allow programmer to specify grouping
1940
Allow advertiser to specify grouping
1945
Group based on other criteria
1950
Group based on combination of criteria
1955

1810

FIG 20

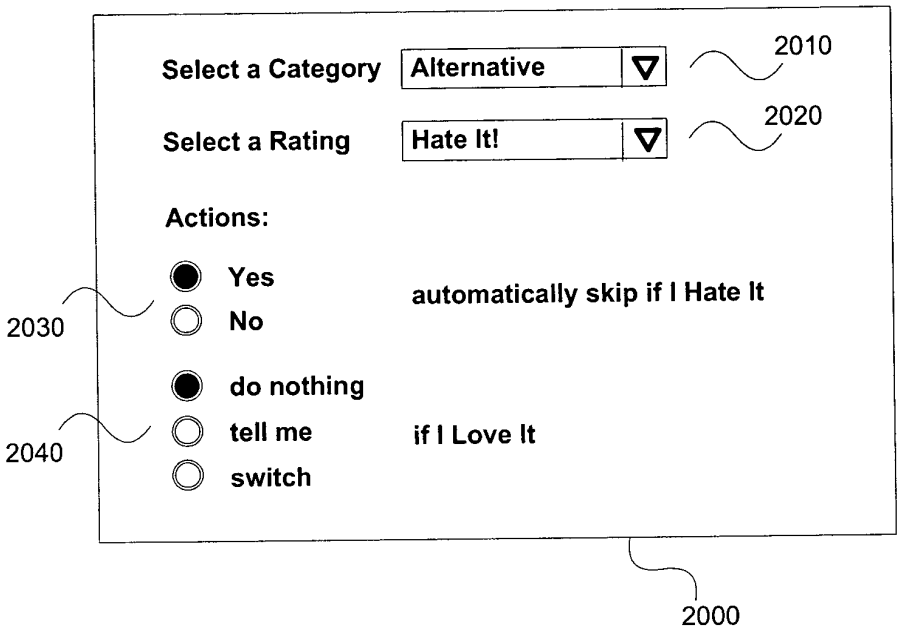
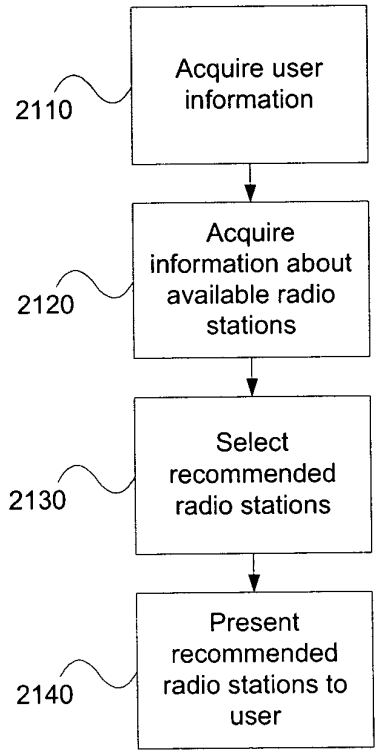
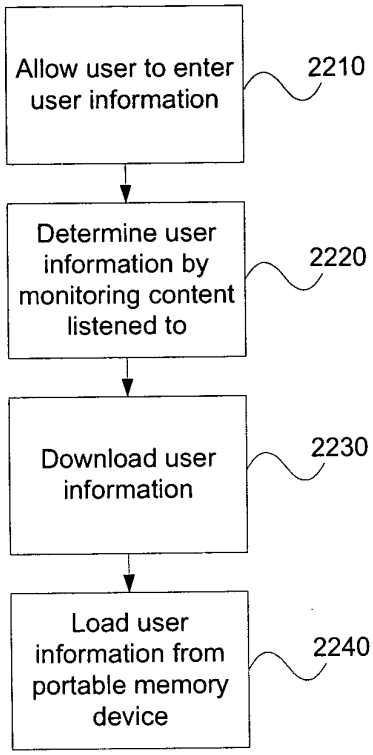

Select a Category
Alternative
2010
Select a Rating
Hate It!
2020
Actions:
Yes
No
automatically skip if I Hate It
2030
do nothing
tell me
switch
if I Love It
2040
2000

FIG 21



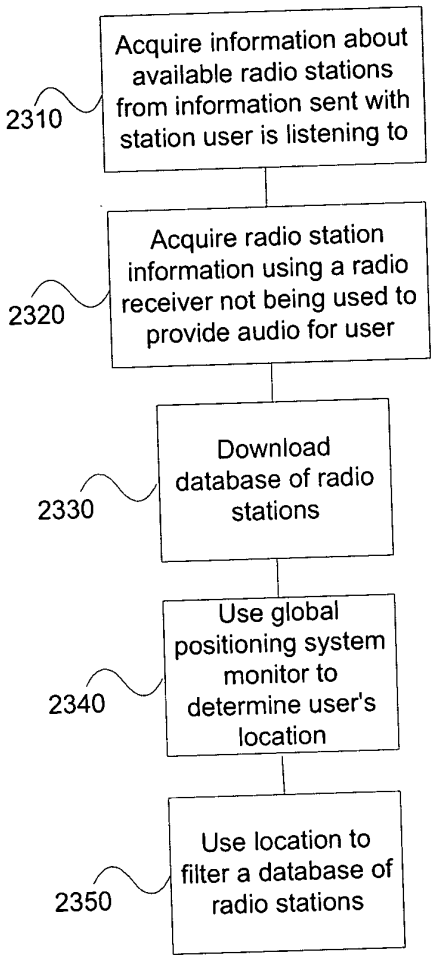
2100

FIG 22



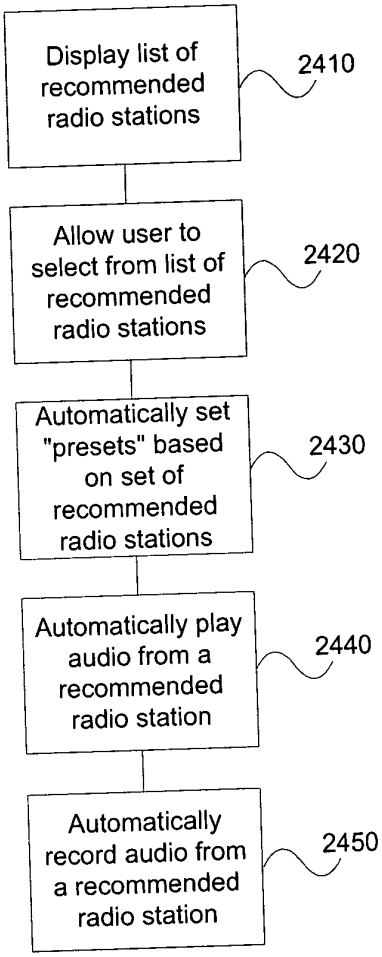
2110

FIG 23



2120

FIG 24



2140

FIG 25

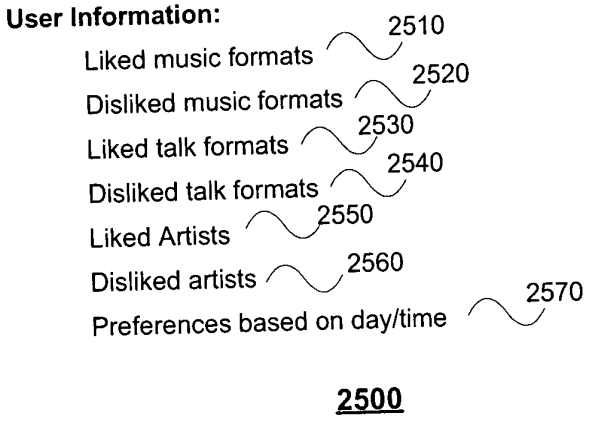

User Information:
Liked music formats
2510
Disliked music formats
2520
Liked talk formats
2530
Disliked talk formats
2540
Liked Artists
2550
Disliked artists
2560
Preferences based on day/time
2570
2500

FIG 26

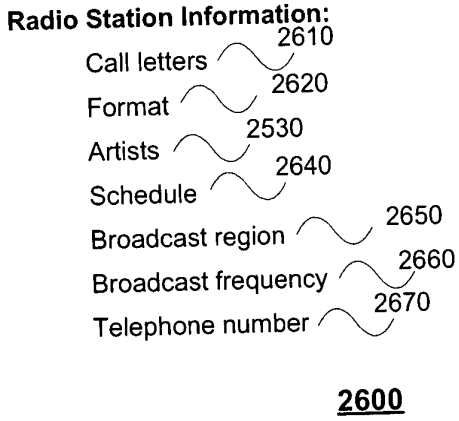
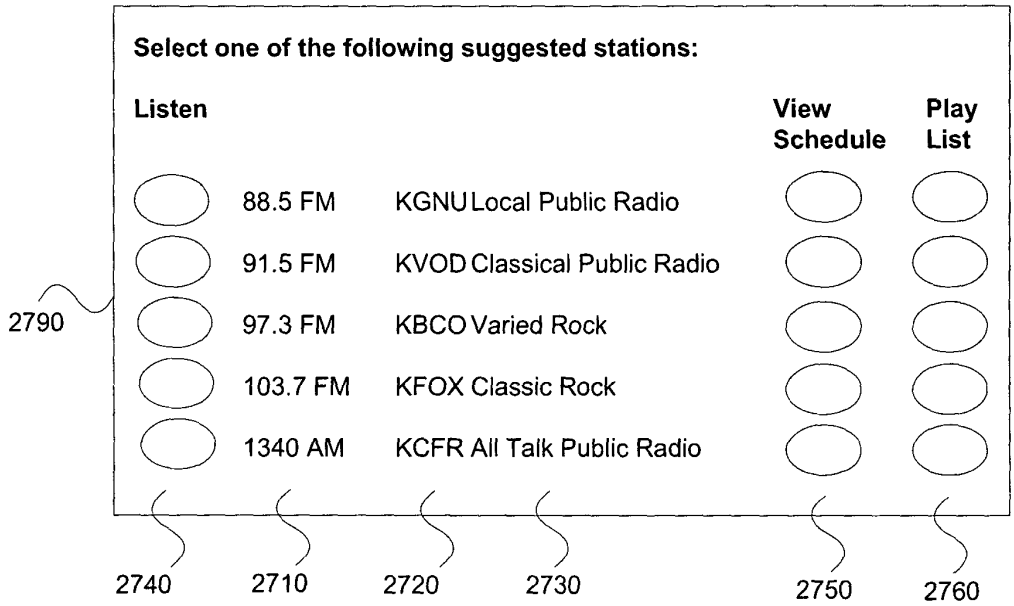
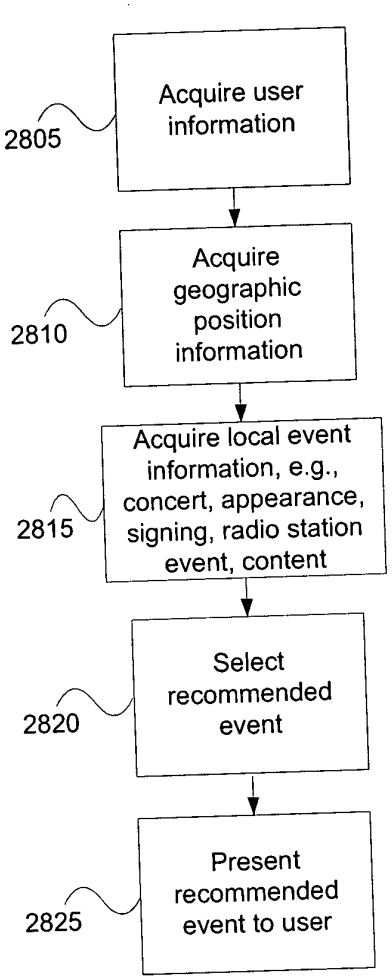

Radio Station Information:
Call letters
2610
Format
2620
Artists
2530
Schedule
2640
Broadcast region
2650
Broadcast frequency
2660
Telephone number
2670
2600

FIG 27


Select one of the following suggested stations:
Listen
View Schedule
Play List
88.5 FM KGNU Local Public Radio
91.5 FM KVOD Classical Public Radio
97.3 FM KBCO Varied Rock
103.7 FM KFOX Classic Rock
1340 AM KCFR All Talk Public Radio
2790
2740
2710
2720
2730
2750
2760

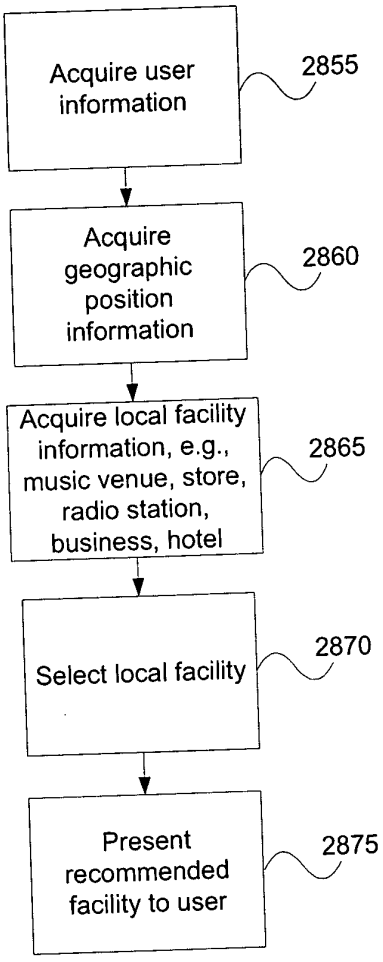
2700

FIG 28A



2800

FIG 28B



2850

FIG 29A

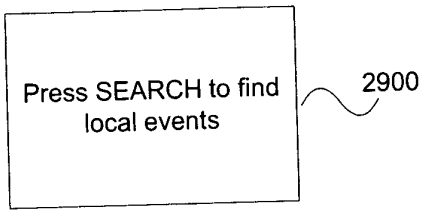


FIG 29B

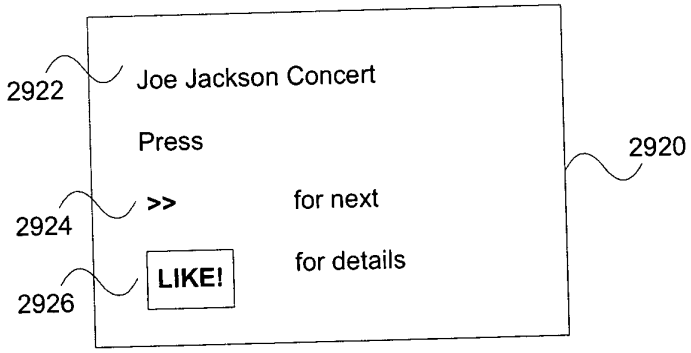


FIG 30

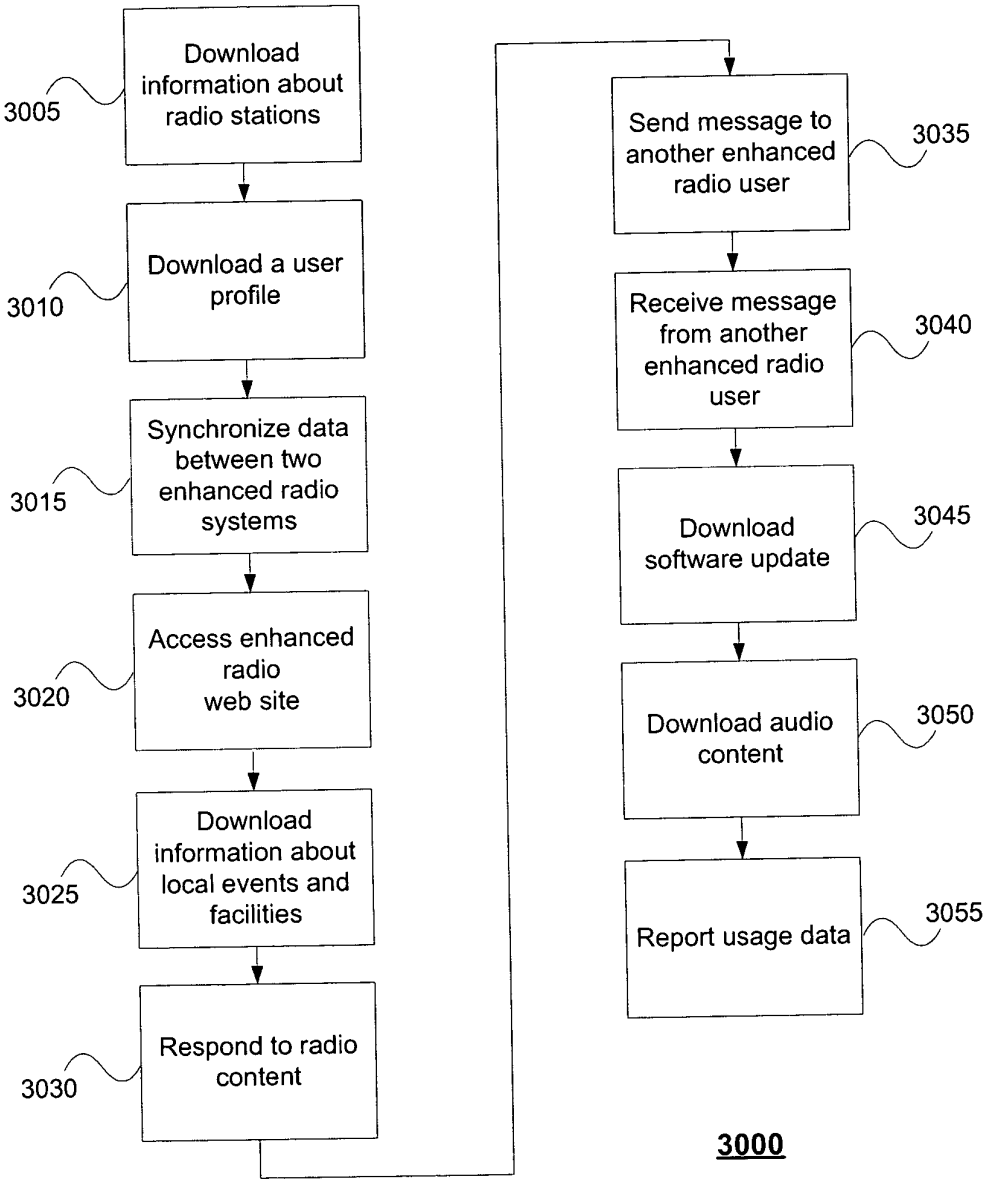

Download information about radio stations
3005
Download a user profile
3010
Synchronize data between two enhanced radio systems
3015
Access enhanced radio web site
3020
Download information about local events and facilities
3025
Respond to radio content
3030
Send message to another enhanced radio user
3035
Receive message from another enhanced radio user
3040
Download software update
3045
Download audio content
3050
Report usage data
3055
3000

FIG 31

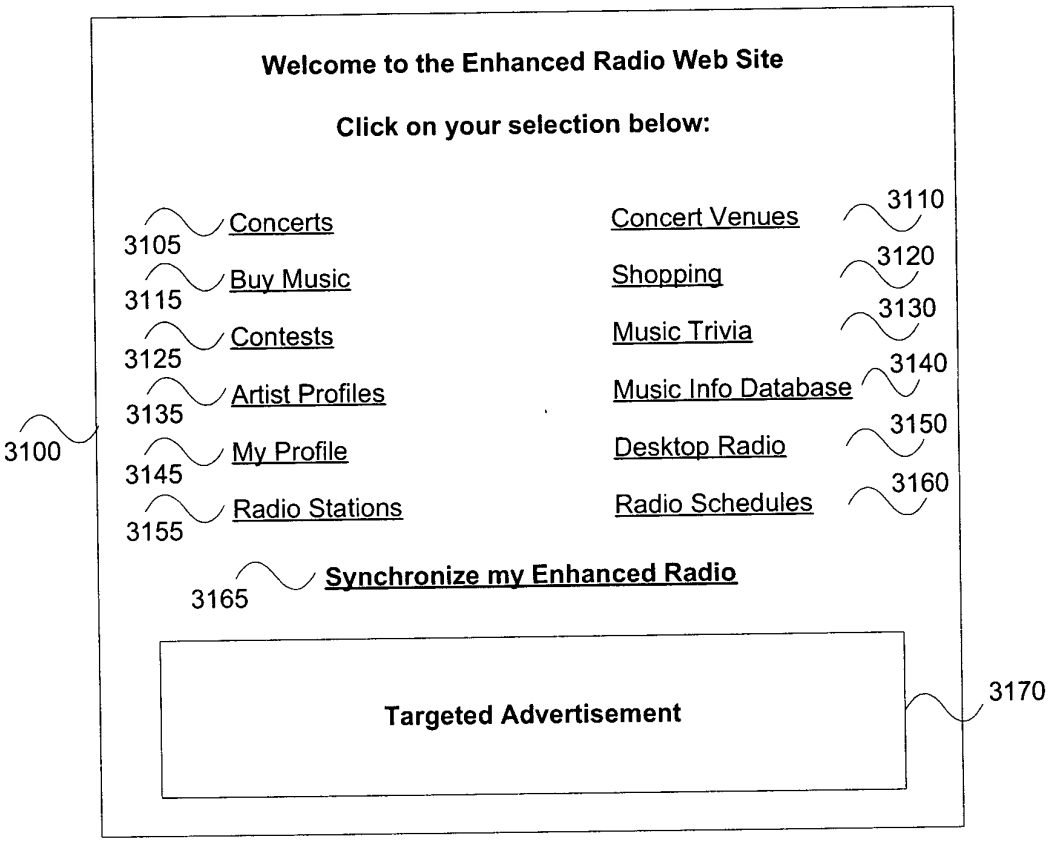

Welcome to the Enhanced Radio Web Site
Click on your selection below:
Concerts
3105
Buy Music
3115
Contests
3125
Artist Profiles
3135
My Profile
3145
Radio Stations
3155
Concert Venues
3110
Shopping
3120
Music Trivia
3130
Music Info Database
3140
Desktop Radio
3150
Radio Schedules
3160
Synchronize my Enhanced Radio
3165
Targeted Advertisement
3170
3100

FIG 32A

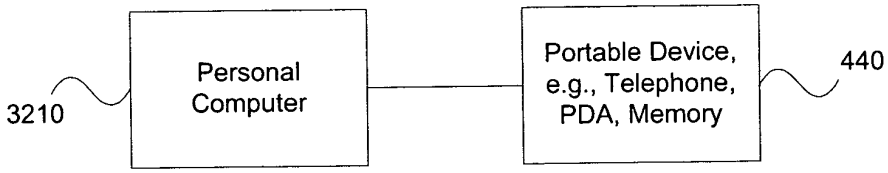


FIG 32B

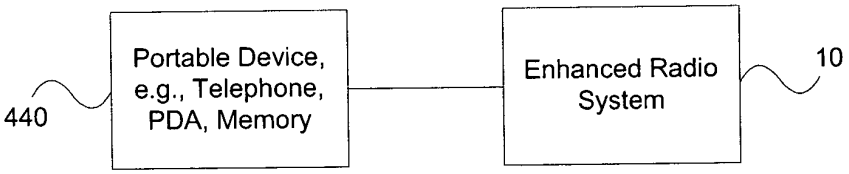


FIG 33A

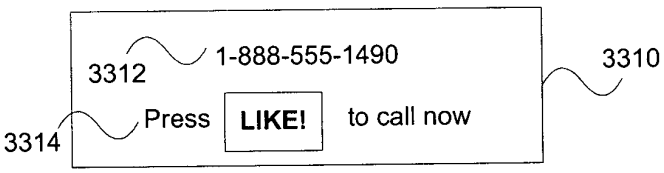


FIG 33B

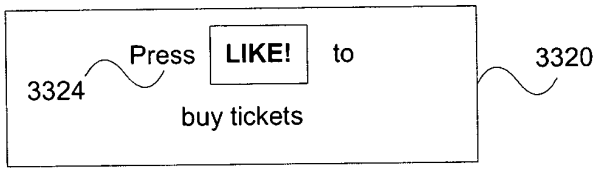


FIG 33C

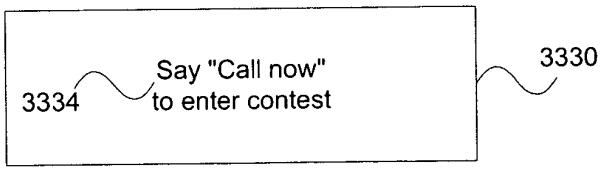


FIG 34

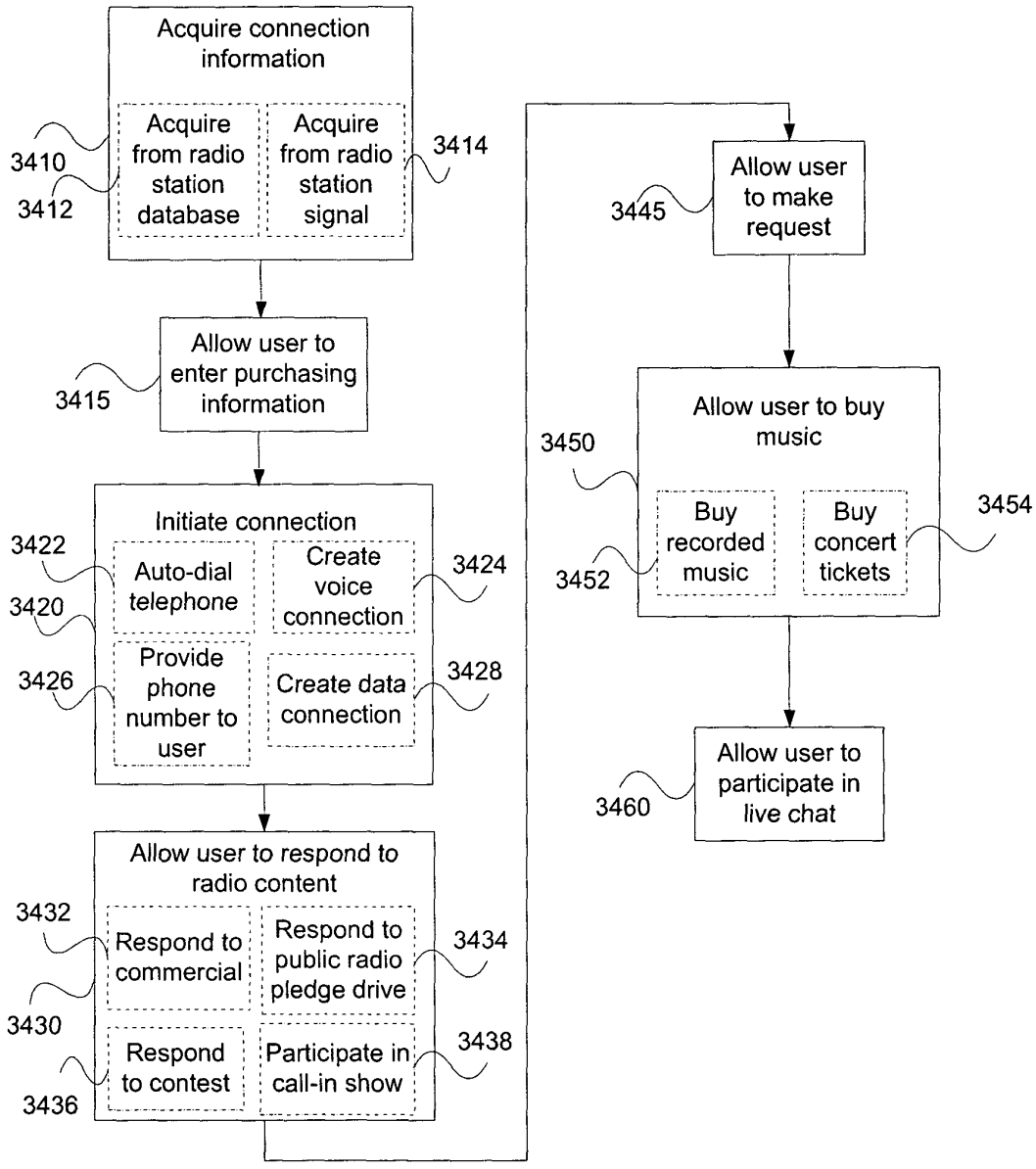
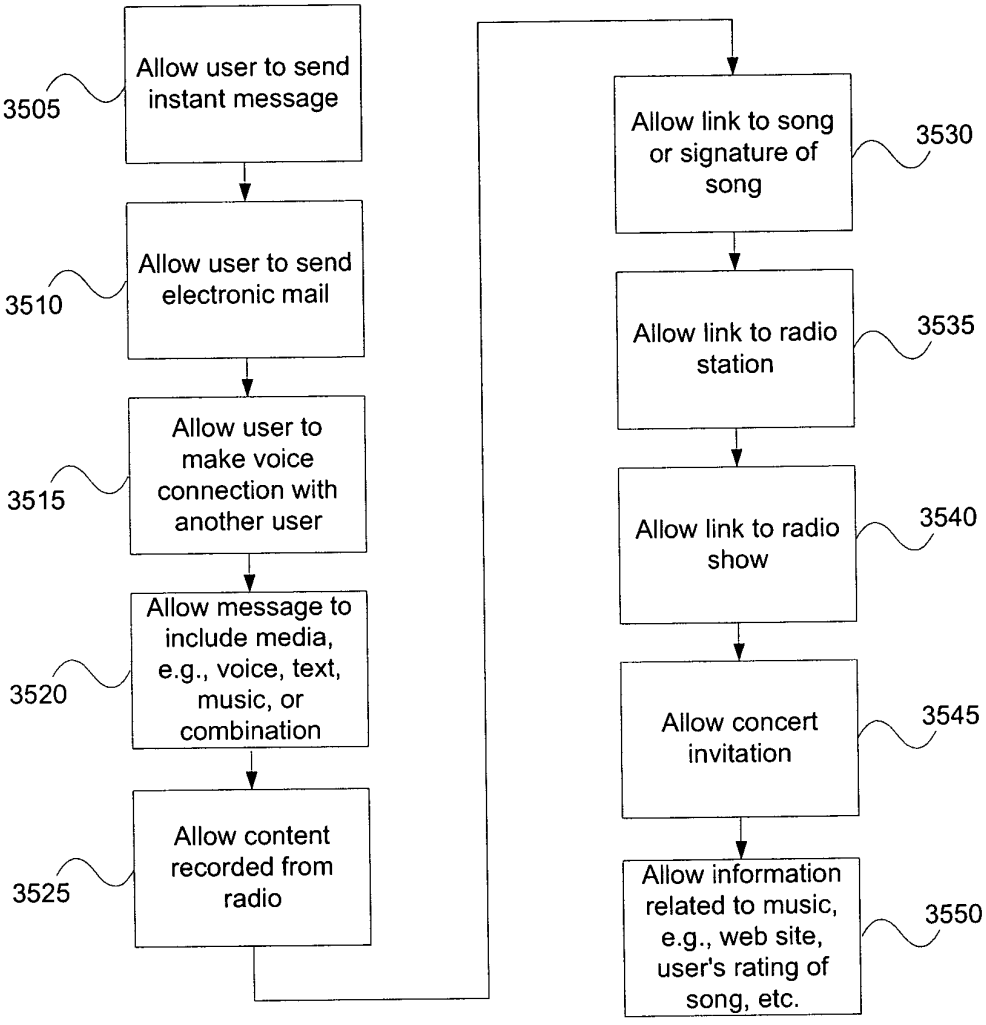

Acquire connection information
Acquire from radio station database
Acquire from radio station signal
3410
3412
3414
Allow user to enter purchasing information
3415
Initiate connection
Auto-dial telephone
Create voice connection
Provide phone number to user
Create data connection
3422
3420
3424
3426
3428
Allow user to respond to radio content
Respond to commercial
Respond to public radio pledge drive
Respond to contest
Participate in call-in show
3432
3430
3434
3436
3438
Allow user to make request
3445
Allow user to buy music
Buy recorded music
Buy concert tickets
3450
3452
3454
Allow user to participate in live chat
3460
3400

FIG 35


Allow user to send instant message
3505
Allow user to send electronic mail
3510
Allow user to make voice connection with another user
3515
Allow message to include media, e.g., voice, text, music, or combination
3520
Allow content recorded from radio
3525
Allow link to song or signature of song
3530
Allow link to radio station
3535
Allow link to radio show
3540
Allow concert invitation
3545
Allow information related to music, e.g., web site, user's rating of song, etc.
3550

3500

FIG 36A

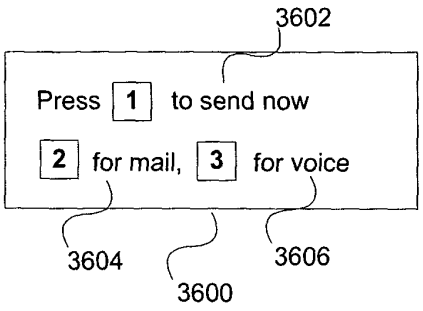


FIG 36B

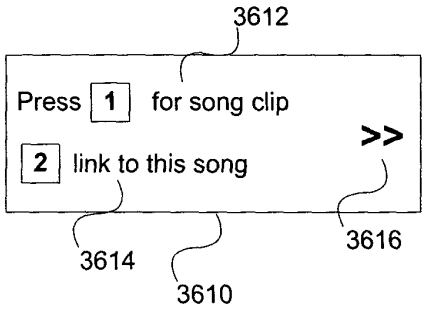


FIG 36C

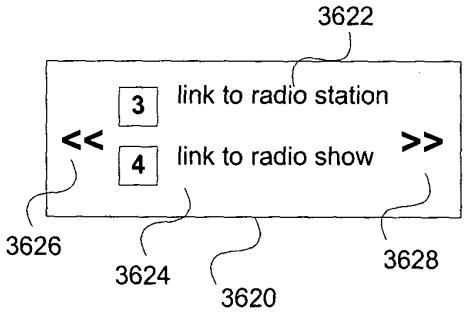


FIG 36D

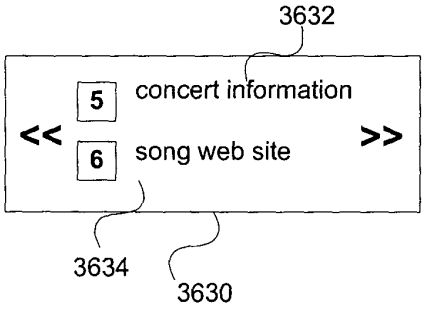


FIG 36E

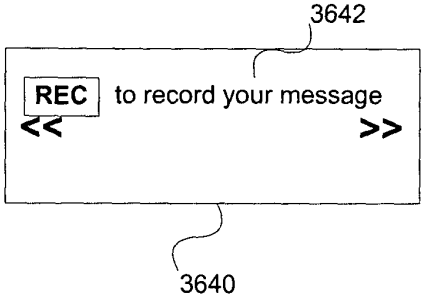


FIG 36F

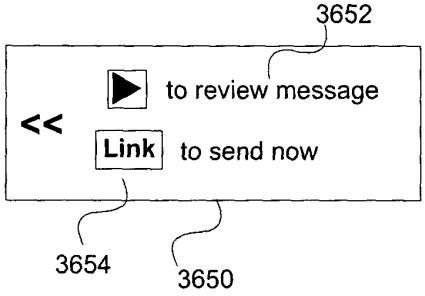
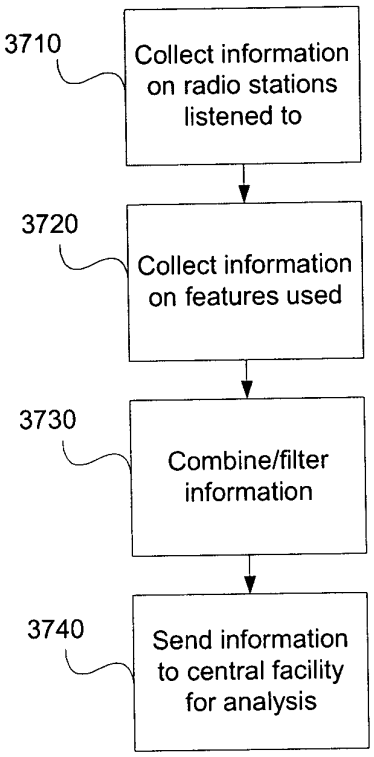
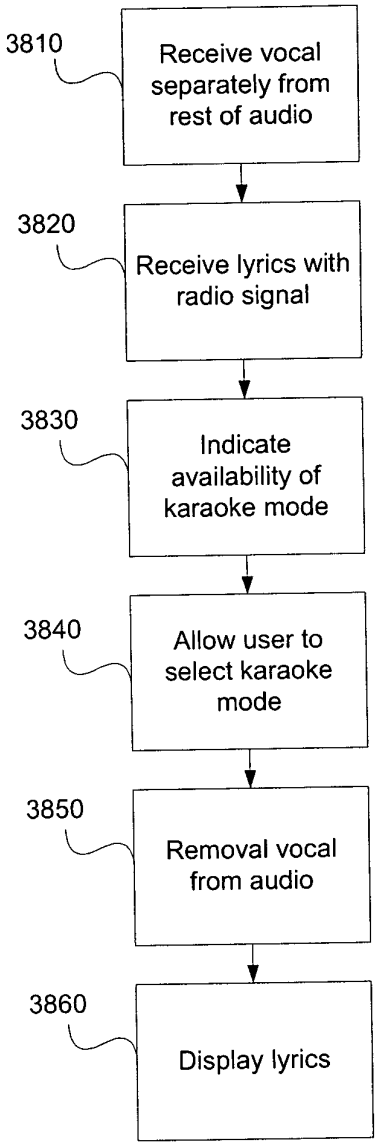


FIG 37



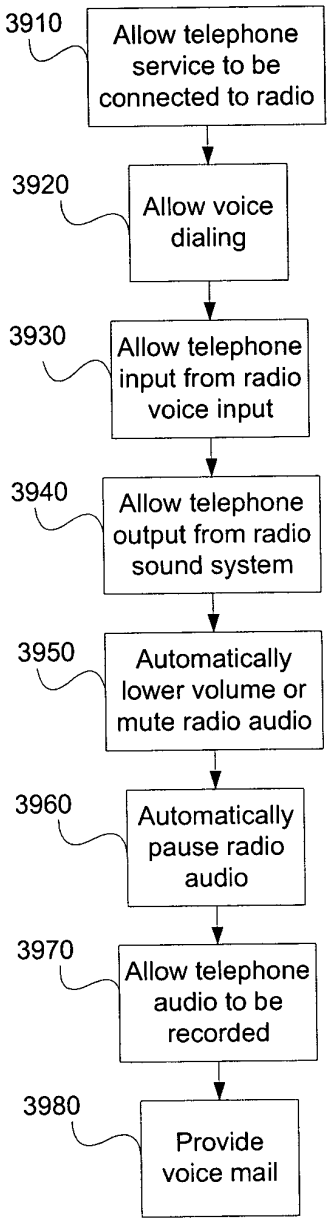
3700

FIG 38



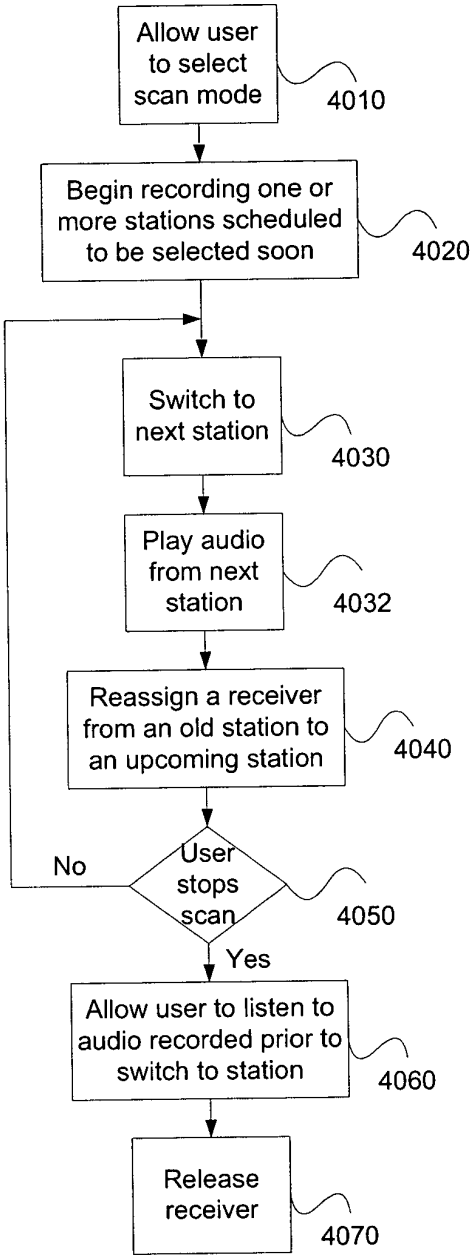
3800

FIG 39



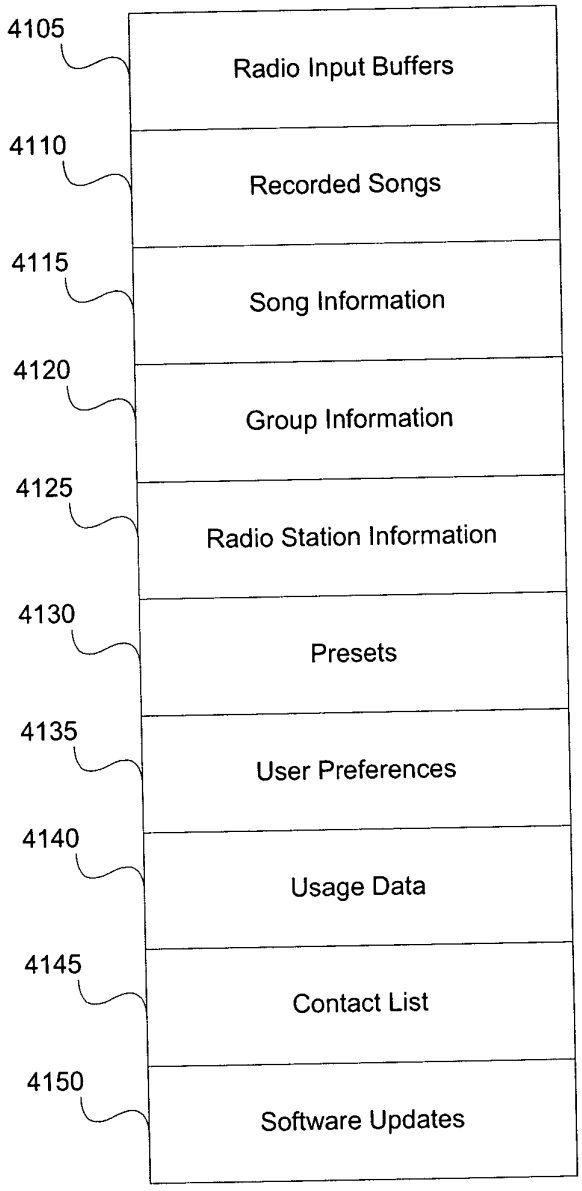
3900

FIG 40



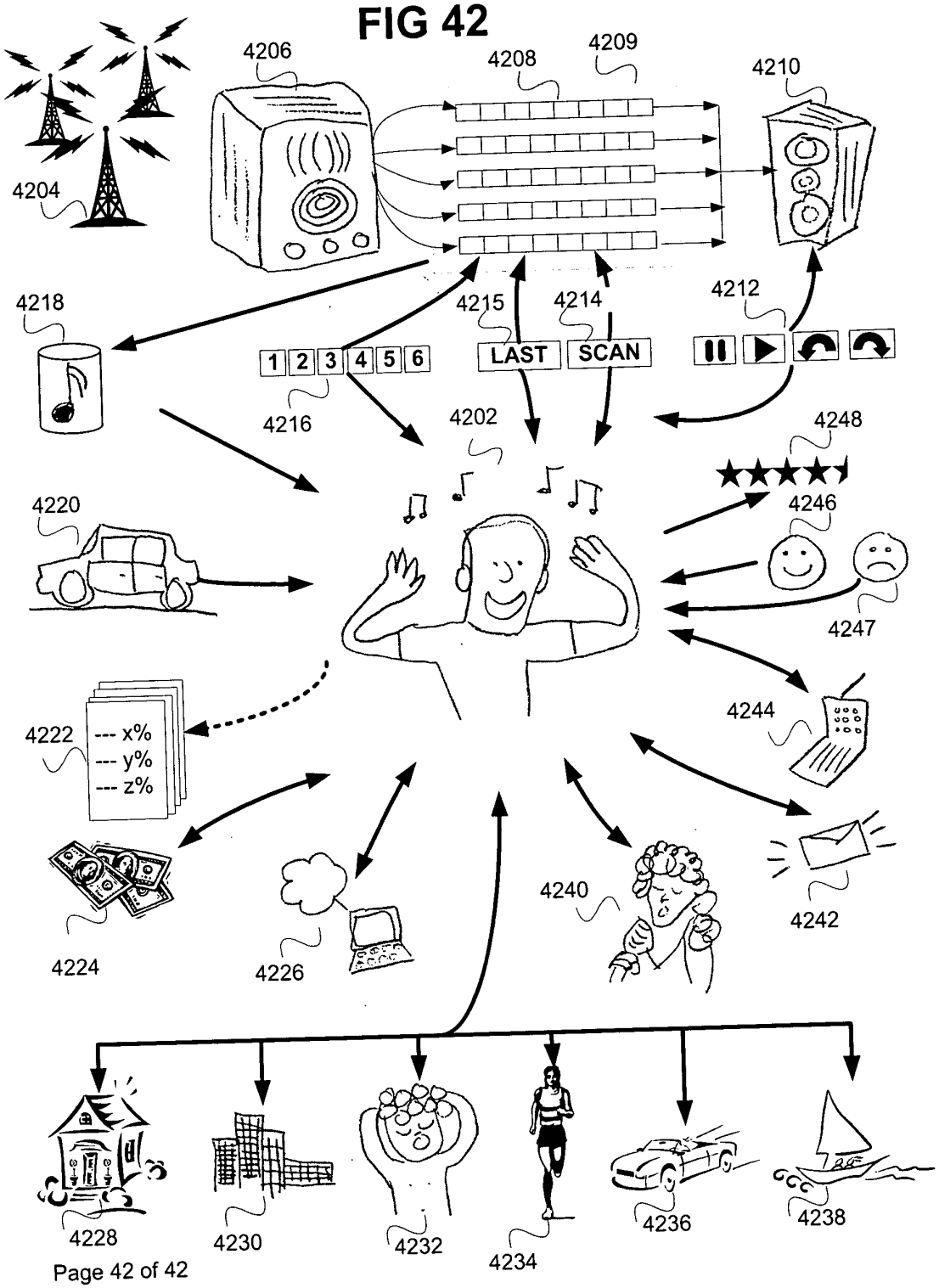
4000

FIG 41


4105
Radio Input Buffers
4110
Recorded Songs
4115
Song Information
4120
Group Information
4125
Radio Station Information
4130
Presets
4135
User Preferences
4140
Usage Data
4145
Contact List
4150
Software Updates

4100

FIG 42


4206
4208
4209
4210
4204
4218
4215
4214
4212
1 2 3 4 5 6
LAST
SCAN
4216
4202
4248
4220
4246
4247
4222
--- x%
--- y%
--- z%
4244
4224
4226
4240
4242
4228
4230
4232
4234
4236
4238